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FIFTH ANNUAL MEETING, INDIANA GAS ASSOCIATION.

HELD IN THE CLAYPOOL HOTEL, INDIANAPOLIS, IND., MARCH 12-13, 1913

SECOND DAY—AFTERNOON SESSION.

REPORT OF THE BUREAU OF INFORMATION.—*Continued.*

Mr. Thwing—The next question (also from Mr. Danforth) was answered by your Chairman, as per the following letters:

"In one of our conversations it seems that I heard you state it was possible, by spraying the oil into a carbureter, to decease the heat units and increase the candle power. My recollection is that the oil should be sprayed in the form of a mist, and that this would increase the candle power at the expense of B.T.U. Inasmuch as our franchise calls for 550 B.T.U. and 18 candle power, I find that, with a mixture of half coal and half water gas, our candle power is too low when we reduce the quantity of oil in the water gas machine, so that the heat units may be correspondingly reduced. In other words, with 560 heat units our candle power is not much over 16, and when we increase the candle power to around 18 our heat units rise to about 610. If you can tell me the type of spray you used, what oil pressure was required, and how greatly your heat units were reduced and your candle power increased, I should like very much to have this information.—B. H. DANFORTH."

Answer.—"From my experience in heat values *vs.* candle power, I have found that the candle power can be increased at the expense of the heat value by spraying the oil, cold, in the form of a fine mist in the carbureter, and keeping the heats as low as possible, consistent, of course, with thoroughly cracking and fixing the oil vapors. The proper temperature for this purpose will depend very largely upon the kind of oil. At the time I conducted these experiments in St. Louis, the use of pyrometers had not yet been adopted, and we had to depend upon sight for judging temperatures. I ran the carbureter at only a fairly bright red heat, and the superheater at a very dull dark red. Without attempting to use your inquiry as an advertising medium, I believe that our latest improved design of oil spray is the one best qualified to help you, although, of course, any spray which will produce a fine mist should be successful. In order to obtain the best results it will probably be necessary to carry a higher pressure than usual on your oil spray, probably even as high as 50 pounds.—O. O. THWING."

Mr. Danforth also favored the Bureau with these questions:

"Can you obtain any definite information relative to the introduction of oxygen in commercial illuminating gas? Is it true this scheme was worked out in New York? What per cent. of oxygen gave the best heating value, and what comparative increase in heating value, for each additional per cent. of oxygen? Could this experiment be made when a complete gas analysis is made and oxygen is used for the explosive mixture in the determination of hydrogen, marsh gas and nitrogen? In other words, one has the oxygen and, with an additional wet meter and the calorimeter, could he conduct the experiment successfully? What would be the cost of oxygen obtained from water separated electrically, when current can be obtained for 4 cents per kilowatt hour? Would a large per cent. of oxygen, combined with commercial coal or water gas, cause an explosion in the distribution system? What per cent.? Would the gas escaping from leaks be largely oxygen if say 10 per cent. of oxygen were added and the leakage was say 8 per cent.? Is there any truth in the so-called stratification of gases?"

Mr. George Summers, to whom the above was referred, replied as follows:

"I have seen no data relative to the use of pure oxygen in gas, but if it has been experimented upon, it could possibly be ascertained by writing to the GAS JOURNALS. If one has oxygen, and an additional meter and calorimeter, the test could be conducted. It would be well to have a small holder containing a known volume of gas and, by adding the metered volume of oxygen, the percentage could be accurately determined in the mixture. Then test mixture with calorimeter. It would be advisable to write some dealer in chemical ap-

paratus, relative to cost of decomposing water. A large amount of oxygen added to gas would cause an explosion in mains provided some means of ignition were at hand. The percentage would depend upon composition of gas added. It could be found by experiment. There is no truth in so called stratification of gas, and, if mixed, there would no oxygen escape from leaks, relatively, than there would be gas escaping."

Your Chairman adds the following:

"1. I have no information relative to the introduction of oxygen in illuminating gas.

"2. The per cent. of oxygen that would give the best heating value would be exactly that per cent. which would form a perfect explosive mixture, with a resultant consisting of nothing but products of combustion and having no excess of either oxygen or combustible gas remaining.

3. "To endeavor to calculate what comparative increase in heat value for each additional percentage of oxygen would be obtained would require time, patience and skill. Oxygen is not a combustible gas, nor has it any heat value, but it is of value only in the production of combustion, which is simply a form of oxidation. The only function it could serve in increasing the heating value (not heat value) of any gas would be that its use, in place of air, would reduce the quantity of products of combustion and consequently the loss of such heat as would be carried away by them. For example, its use to the amount of 10 per cent. of a 600 B.T.U. mixed gas would result in a reduction of heat loss in the waste gases, amounting to 5 B.T.U. per cubic foot per 1,000° F. temperature of the waste gases. On the other hand, the use of oxygen will materially increase the flame temperature, and the use of 10 per cent. of oxygen would result in a flame temperature of 7,250° F., as against a normal temperature of about 5,500° F.

"4. I can see no reason why experiments on this subject could not be made in the laboratory in the manner indicated by you.

"5. The Bureau of Information, American Gas Institute, 1908, issued the following, by C. C. Tutweiler, Philadelphia, Pa.:

"Dr. O. Schmidt, in a paper read before the German Electrochemical Society (1901), said that by electrical decomposition of water, 168 liters of hydrogen and 84 of oxygen can be produced per kw. hour. The cost of compression to 150 atmospheres was said to be 5 per cent. of the cost of production; therefore, 1,000 cubic feet would require 177 kw. hours. By the Garati process, 166 liters of hydrogen and 83 of oxygen are claimed to be produced per kw. hour, or 170.5 kw. hours will produce 1,000 cubic feet of hydrogen."

It will appear from the above statements that to obtain oxygen from water by electrolysis will require about 350 kw. hours per 1,000 cubic feet, which at 4 cents per kw. hour, would amount to $14 per 1,000. You will appreciate, of course, that an installation for the purpose of producing oxygen in this manner commercially would be very expensive.

"6. I am of the opinion that it would be unsafe to introduce oxygen into illuminating gas to the extent of over 70 per cent. of the gas, or the equivalent of 40 per cent. of the mixture. Any additional amount, up to 100 per cent. of the gas, or 50 per cent. of the mixture, might get through all right, but would be dangerous.

"7. I see no reason why the gas escaping from leaks should not be the same as in the mains.

"8. I am not a believer in the stratification of gases, particularly in ordinary practice where the gas is almost constantly in motion. Some very elaborate and extensive experiments were made some years ago in St. Louis, wherein samples of gas were taken from several points of a 4,000,000 foot holder and analysed in order to observe if any stratification occurred. The results indicated that no difference in the constituents of the gas could be observed beyond what would be normally due to personal error."

Mr. J. J. Campbell sent an inquiry which was referred to Mr. J. H. Maxon for reply. The inquiry and reply follow:

"What is the proper distribution or classification of expenditures in a small gas company? For example: To what should expense resulting from complaints be charged? What is the proper expense to charge main line maintenance with? Also, salary of foreman, of fitters, superintendent's salary, etc.? In other words, I would like to have information covering the proper distribution of pay rolls, petty cash, etc."

Reply.—"In arranging for the accounting for a small gas operation, the watchword should be 'Simplicity.' The accounts should be classified under the following general heads:

"Earnings Accounts, General Expense Accounts, Manufacturing Accounts, Distribution Accounts, Stock Accounts, Property Accounts.

"Numerous methods may be adopted for the distribution of expenditures, but in most systems of accounting the charges are finally posted to a general ledger. The accounts in this ledger should be divided into classes as indicated above, and should be given names or numbered—the various sub-divisions of accounts are, perhaps, best handled by giving each account a number."

EARNING ACCOUNTS.

These may be divided into Gas Sales, Mercantile Sales and Residual Sales.

GENERAL EXPENSE ACCOUNTS.

These may be divided into Salaries of Officers, Salaries of Accounting Department, General Office Sundries, Canvassing and Advertising, Rents, Stationery and Postage, Stable Expense, Insurance, Taxes, Legal Expense and Interest.

MANUFACTURING ACCOUNTS.

These may be divided according to the kind of plant operated, but should include all items that are properly chargeable to "Cost of Gas in Holder," such as coal, enrichers, bench fuel, coke, retort house or works' labor, generator fuel, gas oil, purification, etc.

DISTRIBUTION ACCOUNTS.

These may be divided into Distribution Labor, Repairs Mains, Repairs Services, Repairs Meters.

STOCK ACCOUNTS.

These may be divided into Tools and Implements, Office Furniture and Fixtures, Manufacturing Stock, Residual Stock, Mercantile Stock, Meters.

PROPERTY ACCOUNTS.

These may be divided into Real Estate, Buildings and Plant, Mains and Services. Expenditures made resulting from "Complaints" should be charged to Distribution Labor; or an account may be opened under head of Distribution Accounts and named "Complaints."

Main Maintenance should be charged in Distribution Accounts to "Repairs Mains."

The Salaries of Foremen, Fitters and Superintendents should be divided and charged into accounts, according to the nature of the work.

Mr. J. W. Ott writes as follows:

"Under the head of the Bureau of Information, we would like to ask how to prevent and also remove naphthaline from mains."

This question is answered by Mr. Geo. Summers, Mr. B. H. Danforth and your Chairman, in the following letters, which include a second letter from Mr. Ott.

"With reference to naphthaline deposits, will say that such deposits are due to high heats. In order to facilitate its removal, I would suggest running low heats for probably two weeks. They will find at the end of this time that the deposits have disappeared without further efforts. Of course it can be solved by using steam, which wil cause the naphthaline to melt, and can then be handled at the nearest drip. Also, they can inject gas oil into the mains or wherever the naphthaline has been found.

Should any part of the works have chronic trouble from naphthaline deposits, it would be well to run an internal steam line along the bottom of the main, and run exhaust steam through it. This would be a permanent safeguard against accumulation of naphthaline salts. GEORGE SUMMERS."

"I will give you an experience of mine in St. Louis where for some years we had naphthaline troubles in our mains and services that we finally overcame.

"We bought ordinary stove gasoline and would tap a barrel at the bottom, running therefrom a ¼-inch pipe to a sight feed that was connected directly into the outlet main from the works. We would put gasoline into the main a week or so before the regular time of our naphthaline troubles, which usually happened about the 1st of September and the 1st of May. The gasoline was fed into the main for about three weeks in the Fall and Spring and one barrel of 50 gallons would last us about 2 days. We had an output of about 1,000,000 eet of gas every day, so you will note that we used about 1 gallon o 40,000 cubic feet of gas.

"My experience is that naphthaline troubles always occur either in the fall, when the weather is changing from warm to cold, or in the spring, when it is changing from cold to warm, and that where the weather is fairly steady the troubles are not experienced. I believe the above remedy will be about as easy and cheap as any you can employ, and that it will benefit you considerably. O. O. THWING."

"We, for the past 4 years, have had considerable trouble with naphthaline in our mains at certain places and always in the fall, beginning about September and lasting until the weather cooled. I have spent much time on this subject, reading and studying every article I came across, making experiments myself, and still I find but little definite knowledge. Naphthaline and its deposits are treacherous and they do not always follow the same laws.

"In Mr. George Summers' letter he states that naphthaline is caused by high heats. I do not agree with him in this, while I would admit that it is an adjunct in producing naphthaline.

"Three years ago we were producing about 7,500 cubic feet of gas per mouthpiece in 24 hours, and our naphthaline troubles were nearly or about equal to last year, when we were producing about 10,200 cubic feet per mouthpiece. Even several days in succession we would make as high as 12,000 cubic feet.

"One of our eminent engineers[1] of the Western Coast, last year, in an article, stated that the cause of naphthaline in mains was sudden change in temperature in the ground through which the mains passed. My experience to considerable extent bears him out. I wish to relate an experience we had sometime ago. The mains running from the works to the holder became clogged with a hard, yellow substance, which was no doubt naphthaline. We closed down our works and filled the mains with water; but to no avail. We turned in steam with no better results. We then put in a 4-inch fire hose and turned on water, but only blew out a few pieces. We took these chunks and tried to steam them, put them in gasoline, then kerosene oil, but they would not dissolve. We next heated the kerosene oil and it dissolved rapidly. We shut down and filled them with kerosene oil, and turned steam into it. The agitation of the oil caused by the steam soon cleared the main entirely.

"We have handled main troubles by running a ¼-inch pipe at or near the trouble, to the curb, so at intervals could run in a few gallons of gasoline. Your method of injecting it in small quantities and all the time seems best. Would further like to inquire if you think it would be any improvement to heat the gasoline with steam coil before it is put into the mains. We are trying another scheme this year, one on which I would like your opinion. We are running our condensing machinery very cold. Our object in this is to cool and condense the gas as low at least as it will be in any place along the main. By condensing out the naphthaline and leaving it in the works where it can be more easily got to. Naphthaline I consider one of the hardest, most treacherous and provoking things a gas man has to contend with.—J. M. OTT."

"There are a number of solvents which can be used for the removal of naphthaline, the best known being gasoline. But the Semet-Solvay Company has produced a solvent which is capable of absorbing a much greater amount of naphthaline, per gallon, than gasoline. They advise that the solvent be fed into the outlet of the storage holder with a sight feed. If the naphthaline conditions were not bad a gallon every 24 hours for a period of 60 days should clean up the system in a city of the size of Rochester. The solvent should be fed in drop-by-drop, as the results are better than if all poured in at one time. I would advise that Mr. Ott purchase a drum of this solvent at once and start using as soon as received, for this is the time of the year in which to rid the system of naphthaline.

"If the stoppages are confined to one main or one locality, the introduction of the solvent should not be as stated above. By ascertaining the direction of the flow of gas, and deciding on a suitable location, one is ready to excavate for the main. If the flow is north the main should be dug up south of the point affected and tapped for an inch pipe. A second excavation should be made, say 50 feet south of the first and a ¼-inch tap made. The apparatus consists of a drum of solvent, a water heater, two trestles, on which to place the drum, and pipe and fittings to connect the heater. The heater should be set on the ground level, just at the edge of the excavation, and the top outlet should be run into the inch opening in the main. This connection should be as direct as possible, or the vapors from the heater will condense before entering the main. The drum of solvent should be set a safe distance from the heater, for the solvent is very volatile and there is danger of an explosion. After the drum is placed on the trestle a vent should be run from the top, so no very great pressure could collect in the drum. The bottom water connection of the heater should be connected to the bottom of the drum, and a stop-cock placed in the line so that the flow can be regulated. The gas supply for the burner must be taken from the ¼-inch tap, or the vapors from the solvent will carbonize and poor combustion in the burner will result. After all connections are made, proceed as follows: See that solvent supply to heater is shut off and light burner under heater. When coil in heater becomes hot, turn on just enough solvent so it is not dropping, but just barely running. This can be determined by opening cock before the heater is connected, and when the proper steam is being passed, mark the cock. Regulate the burner flame, so the outlet pipe from the coil is hot to the touch.

"The solvent should be run into the main during the time of greatest consumption, and care must be exercised in the amount of solvent used. The writer used gasoline in this manner, and carbonized half the gas mantles in the town, then moved the apparatus to the other end of town, and carbonized the balance. It is not necessary to state that the naphthaline disappeared. In closing, the writer desires to caution anyone using this method to be very careful and have all of the connections tight.—B. H. DANFORTH."

"I have never used the solvent mentioned by Mr. Danforth, but have heard it spoken of highly. I am of the opinion that the solvent can be used cold, in the same manner that gasoline is used, and really believe that the heating arrangement is not absolutely necessary. It is likely that you could obtain further information on this subject by writing the Semet-Solvay Company. Referring to your letter of July 27th, with special reference to your experience with the hard, yellow substance. I would state that this substance was undoubtedly naphthaline, that had been deposited, afterward dissolved and then redeposited. The second deposit of naphthaline becomes very hard, and it is almost impossible to again dissolve it, except with hot oil, such as you used. Referring to your inquiry, as to whether it would be any improvement to heat the gasoline. I am frank to state that I do not believe anything is accomplished by so doing. The gasoline, if put in after the manner referred to in my previous letter, will immediately vaporize and pass on with the gas, and the object of heating it would be simply to convert it into vapor. If put in the mains in the form of vapor, the vapor will very quickly assume the temperature of the gas, and, therefore, the preheating, to my mind, does not accomplish any result. I believe that your scheme of running your condensers quite cold will be of material assistance, although it will, of course, somewhat affect your candle power.—O. O. THWING."

Mr. T. J. Smith, Jr., wrote the Bureau as follows:

"There is considerable controversy in regard to the proper method of conducting comparative efficiency tests for circulating or tank water heaters. Our Committee would appreciate information from you as to the best way in your opinion by which these efficiency tests may be obtained."

The inquiry was referred to Mr. H. Kaufman who returned the following information:

"I believe the faucet capacity, in gallons of hot water delivered per minute, and the efficiency of the heater at the faucet, the most desirable and true test of any tank heater, and would refer Mr. Smith to the mode of testing the tank heater, recently used in a School of Applied Science. For his convenience I am giving you the School's plan of testing:

Duration of test, minutes.
Gas meter, at start.
Gas meter, at finish.
Gas consumption, cubic feet.
Gas consumption per minute, cubic feet.
Pressure of gas in meter, inches of water.
Temperature of gas at meter, degs. F.
Pressure of gas in calorimeter-meter, mm. of water.
Heat value (high) of illuminating gas supplied to heater, B. T. U. per cubic foot.
Stack temperature, degs. F.
Weight of water heated, pounds.
Temperature of cold water, degs. F.
Temperature of hot water, degs. F.

1. E. C. Jones, Engineer, Gas Division, Pacific Gas and Electric Company.

Temperature rise, degs. F.
Water heated per minute, gallons.
Cubic feet of gas (62° F. and 14.7 pounds) per gallon of water heated.
Heat imparted to water, B. T. U.
Heat developed by gas, B. T. U.
Efficiency of heater.—H. KAUFMAN."

The matter was also referred to Mr. J. M. Morehead, of the Peoples Gas Company, Chicago, who kindly furnished the Bureau with the following exhaustive instructions:

TESTING OF GAS-FIRED WATER HEATERS.

Explanation: Heating of Water.—"The heating of water for domestic purposes by gas-fired appliances, ordinarily termed water heaters, demands a clear definition of what is meant by the term 'hot water.' The phrase 'hot water' is indiscriminately applied to water at any temperature ranging from about 100° F., up to 212° F. The term 'hot,' as ordinarily used, is indefinite, purely relative, and depends upon the condition—thus, to a man who has been for sometime in a room where the temperature is 90° F., water at 60° F., would feel rather cold, while the same water would be warm to a man who has just emerged from a cold room where the temperature was 32° F., or below. It naturally follows, however, that some definite temperature must be arbitrarily chosen so as to draw a line between 'warm' and 'hot' water. As a result of numerous experiments, it was found that, in a room where the temperature was about normal (namely, 75° F.) water at 120° F. was unbearable to the hand, while water at temperatures ranging from 120° F. to about 85° F. could be borne more or less comfortably, and water at temperatures below 85° F. felt cool. It was, therefore, decided that, water at temperatures of 120° F., or above, should be designated as 'hot,' while water below 120° F. should be termed 'warm,' or 'cool,' if down as low or lower than room temperature. As the yearly average temperature of water supplied in Chicago is close to 60° F., although it may range from 35° F. to 75° F., a heater which would raise the temperature of water at least 60° F., or on the average from 60° F. up to 120° F., may be truly termed a 'hot' water heater."

General Considerations.—In the testing of a water heater, it should be subjected to a number of general considerations, to define its relative value or utility to the gas consumer or gas company. Investigation should be made to determine whether or not it is safe when operated by the average consumer under conditions reasonably to be expected. Particular attention should be paid to the general freedom from flashing back of flame with possible burning of one who attempts to light the burner. Any possibility of ignition of adjacent combustible material, due to unduly heated part of the appliance or exposed flame, deserves attention. Poor combustion should be noted, as the formation and escape of quantities of carbon monoxide into a room, due to poor draft or other factors, is dangerous and certainly not hygienic. Attention should also be given to the following considerations:

Design and Construction.—The heater should be reasonably attractive in appearance, so designed and constructed as to properly perform its functions under conditions to which it is to be subjected.

Material.—The material of which its parts are composed should be first-class and reasonably durable.

Workmanship.—The workmanship and assemblage of all parts should be first-class.

Operation.—It must permit of ready, safe, and efficient operation under all conditions to which it may be ordinarily subjected.

Maintenance.—It should require little attention such as adjustments or repairs.

Method of Testing.—Connect water heaters of the direct contact type.[1] If of the indirect contact type, it should be connected up for test. However, some water heaters, owing to their special construction or operation, may require unusual connections. In general, when the connection has been made as shown, first open valve A on the inlet water supply line storage tank, close G and open cocks D, E and F so as to fill tank and heater with water. When system is full the water is flowing from tank through cock F, into drain pipe through cock I and pass cock F (which should be closed) adjust water flow by means of cock F until sufficient water is passing to prevent burning out or overheating of heaters. The gas valve, B, should be opened slightly and sufficient gas passed through meter and burner to purge gas supply line. Do not attempt to ignite gas until the gas supply line has been purged and all unburned gas which has escaped into the heater has been driven out by thorough ventilation of the interior. When this has been done, temporarily close off primary air ports if possible and, after closing cock or valve C, of appliance, open valve B, then open cock or valve C, and immediately apply lighted wax taper or match to top of burner. In case heater is supplied with pilot light, valve C should be kept closed until pilot burner is ignited, which in turn will light the main burners when valve C is opened either by hand or automatically. After gas is burning adjustment of valve B should be made until pressure of gas on appliance is $\frac{4}{10}$ths inches of water (or pressure assumed to be the average under which gas appliances operate in the locality). Adjustments for the primary air ports should be made to give a good non-luminous or Bunsen flame, and show that combustion of gas is complete as evidenced by the absence of carbon monoxide, CO, in an analysis made of the flue gases. The adjustments should be such that the maximum volume of gas allowing perfect combustion be supplied to the burner which should at the same time permit of variation in gas pressure from 2 to 6 inches of water (or over a range found for a given locality) without allowing a flash-back. When best adjustment is found for gas adjust water flow through heater by means of cock F (valve A and cocks D and I being open and cocks E, G and H being closed) until thermometer No. 2 on the hot water outlet shows (after 15 or 20 minutes running) a temperature of about 60° F. higher than thermometer No. 1 on the cold water inlet pipe. Now, with empty water barrel on scales, close cone J, and bring scale to a balance. A test may now be made. One man should station himself at platform scales, and another at meter, where he should read the meter and start a stopwatch just as the large dial hand passes the zero mark, and at the same instant signal the man at the scales to simultaneously close cock I, and open cock H. The man at meter should then read, at minute intervals, the temperatures shown by thermometers 1, 2, 7 and 8 and see that the pressure of gas on the appliance remains constant at $\frac{4}{10}$ths inches. The man at the scales should then place second rider weight to 50 pound mark. As the scale beam rises, the man at scales must instantly signal man at meter, which must be read and the watch stopped simultaneously with signal. The results of all observations made should be carefully recorded on log sheet 1, a sample form of which accompanies these instructions. Run a duplicate or check test for each given condition. If possible, make tests of heating value of the gas simultaneous with the running of each test or as near thereafter as possible. It is absolutely essential that the heating value of the gas be determined by some reliable instrument such as the Junker's, otherwise the efficiency or capacity cannot be determined with any degree of accuracy. Without changing the gas pressure on the appliance, or the adjustment of the gas supply, regulate the flow of water to give different raises in temperature of the hot outlet water over the cold inlet water. Raises of approximately 70°, 80°, 90° and 100° form convenient conditions under which an original and check or duplicate tests should be run. Run these tests in a similar manner to the previously outlined method when heater is adjusted to give about 60° F. rise in water.

Log Sheet No. 1.—Running Water Tests.

Make of heater	X
Number of test	1
Date of test	1-1-12
Duration of test	10
Barometric pressure in inches of mercury	29.20
Gas pressure in inches of water	40/10
Gas pressure in inches of mercury	.29
Absolute gas pressure in inches of mercury	29.49
Room temperature in degs. F	70.
Gas temperature in degs. F	70.
Correction factor for temperature and pressure	.957
Meter reading at finish in cubic feet	85.87
Meter reading at start in cubic feet	75.25
Gas consumed by heater in observed cubic feet	9.96
Gas consumed by heater in corrected cubic feet	9.53
Gross heat value of gas in B.T.U. per corrected cubic foot	660.
Weight of water barrel at finish in pounds	128.
Weight of water barrel at start in pounds	53.
Weight of water passed through heater in pounds	75.
Gallons of water passed through heater per minute	.90
Weight of water condensed by heater in pounds	....
Average temperature of outlet water at No. 2 in degs. F	123.

1. These illustrations did not come to hand.—EDS.

Average temperature of inlet water at No. 1 in degs. F..... 60.
" " rise of water in degs. F..... 63.
" " of flue gases at No. 7, degs. F..... 301.

Analysis of flue gases:

Carbon dioxide	(CO_2)	10.0
Oxygen	(O_2)	8.2
Carbon monoxide	(CO)	0.0
Nitrogen	(N_2)	81.8

Log Sheet No. 2.—Storage Tank Tests.

(Same general data as Log Sheet No. 1, and in addition the following:)

Weight of water in tank and heater, pounds.
Gallons of water in tank and heater.
Weight of water condensed by heater, in pounds.
Average temperature of inlet water at No. 1 in degs. F.
Average temperature of outlet water at No. 2 in degs. F.
Total temperature rise of tank water at No. 3 in degs. F.
" " " " " " " No. 4 " "
" " " " " " " No. 5 " "
" " " " " " " No. 6 " "
Average temperature rise of total tank and heated water in degs. F.
" " " " flue gases at No. 7 in degs. F.

Carbon dioxide	CO_2
Oxygen	O_2
Carbon monoxide	CO
Nitrogen	N_2

Calculations of Data.—After recording all the data, general observations and general totals or averages on log sheets, Nos. 1 and 2 (upon which some assumed data has been placed), calculate additional data as follows:

$$\text{Gas pressure in inches of mercury} = \frac{\text{Gas pressure in inches of water}}{13.6}$$

$$\text{Thus: } \frac{4}{13.6} = .29$$

Absolute gas pressure in inches of mercury = (barometric pressure in inches of mercury) + (gas pressure in inches of mercury).

Thus: 29.20 + .29 = 29.49.

Correction factor for temperature and pressure may be obtained from the customary factor tables for changing observed gas volumes to standard temperature and pressure conditions of 60° F. and 30 inches of mercury, respectively.

Thus: Factor for 70° F. and 29.49 inches of mercury = .957.

Gas consumed by heater in corrected cubic feet = (gas consumed by heater in observed cubic feet) multiplied by (correction factor).

Thus: 9.96 × .957 = 9.53. Gas consumption in corrected cubic feet per hour = (gas consumed by heater in corrected cubic feet) × $\frac{60}{\text{the duration of the test in minutes.}}$

Thus: $\frac{60}{10}$ (= 6) × 9.53 = 57.18 cubic feet per hour.

Gallons of water passed through heater per minute =

$$\frac{\text{Weight of water passed through heater in pounds}}{8.33 \text{ (duration of test in minutes).}}$$

Thus: $\frac{75}{8.33 \times 10}$ = .90 gallon per minute.

Calculations of Results.—Using the assumed data upon log sheets, the calculations of efficiency, capacity, etc., may be made as follows:

(Gas consumed by heater in corrected cubic feet) × (gross heat value of gas in B. T. U. per corrected cubic feet) = the total heat supplied in gross B. T. U. per cubic foot.

Thus: 9.53 × 660 = 6289.8 B. T. U.

(Weight of water passod through heater in pounds) × (the average rise in temperature of the water in degs. F.) = the total heat absorbed by the water in gross B. T. U.

Thus: 75 × 63 = 4,725 B. T. U.

The percentage thermal efficiency =

$$\frac{\text{(The heat absorbed by water in B. T. U. } \times 100)}{\text{The heat supplied by gas in B. T. U.}}$$

Thus: $\frac{4{,}725 \times 100}{6289.8}$ = 75.1 per cent.

The *capacity* of the heater to produce hot water (that is, water which has been raised at least 60° F. on 650 B. T. U. gas) =

$$\frac{\text{(Gallons of water passed through heater per minute) } \times 650 \text{ (the average rise in temperature of water in degs. F.)}}{60 \text{ (the gross heat value of the gas in B. T. U.).}}$$

Thus: $.90 \frac{650}{60} \times \frac{63}{660} = .90 \frac{4095}{3960}$ = .93 gallons per minute.

The percentage of flue gas consisting of air = (the percentage of oxygen by analysis) × 4.771.

Thus: 8.2 × 4.771 = 37.1 per cent.

Interpretation of Results.—The interpretation of results and general conclusions regarding a given water heater must be largely by comparisons.

"The following analysis and explanations illustrate, in a general way, possible flue gas analyses, and will aid in interpreting the results of a given analysis of flue gases:

Constituent.	No. 1.	No. 2.	No. 3.	No. 4.
Carbon dioxide (CO_2)	10.0	8.0	10.9	3.0
Oxygen (O_2)	5.0	5.0	0.5	15.0
Carbon monoxide (CO)	0.0	1.0	2.0	0.0
Nitrogen (N_2)	85.0	86.0	87.5	82.0

"1 is typical of good combustion, as it shows no carbon monoxide and an excess air content of not over 25 per cent. of the volume of the flue gases. By multiplying the per cent. of oxygen by 4.771 the per cent. of excess air in the flue gas is obtained. Thus 5 × 4.771 = 23.85 per cent in analysis No. 1.

"2 is typical of a flue gas resulting from imperfect combustion of gas. This may have been caused by the sudden cooling of flames, by their impingement on relatively cold water coils, etc., or by a poorly arranged secondary air supply. Too great a supply of gas to the burner sometimes causes the above conditions.

"3 is typical of an insufficient primary or secondary air supply, which results in imperfect combustion. This analysis might also be obtained where an excessive amount of gas is supplied to the burners.

"4 is typical of an appliance, in which an unnecessary volume of air is supplied as secondary air, or is drawn into the flue elsewhere.

In this analysis 15 by 4.771, or 71.57 per cent., of the flue gases is excess air which serves no good purpose and absorbs heat which it carries into the flue. Comparisons of the efficiencies, capacities, etc., on running water tests, are valuable as regards heater when the hot water is drawn off almost continuously, while comparisons of the rate of rise in temperature of water at each tank thermometer, the net efficiency and capacity with a 30-gallon tank, etc., are very useful in deciding questions regarding the circulation and storage of hot water.

Mr. Thwing—At the first meeting of the Executive Board a suggestion was made by Mr. James W. Dunbar, which was referred to the Bureau of Information for attention. The following letter will, I believe, fully explain the matter to the members of the Association:

INDIANAPOLIS, IND., March 23, 1912.

DEAR SIR: At the last meeting of the Indiana Gas Association it was decided to adopt the recommendation contained in the Presidential Address of Mr. S. E. Mulholland, in regard to the formation of a Bureau of Information, to which the members of the Indiana Gas Association could apply for advice and information concerning matters that would require additional and possibly expert advice on subjects that were new and unknown to the inquirer. This Bureau of Information has now been organized.

In order to make this Bureau an aid it must be used, and all members of the Indiana Gas Association are cordially invited to take advantage of its existence, and to write freely on any subject that is perplexing or difficult. Address all communications to the Chairman, Mr. O. O. Thwing, Fort Wayne, Ind., who will submit them to the proper department for attention and advice.

In accordance with the original recommendation, it is intended that a record of the work of the Bureau shall be kept and made a part of the "Yearly Proceedings," and it is believed that a great deal of benefit will accrue, not only to those members of the Association who desire advice, but also from the general discussion that will take place during the meeting over the work of the Bureau and the suggestions made by it.

Remember that the services of this Bureau are absolutely free to

any member of the Association, and it is hoped that a great many of them will take advantage of its services.

Very truly yours,
HOWARD L. OLDS, President.
P. EVES, Secretary-Treasurer.

Our President, Mr. Olds, entered into this matter very thoroughly and prepared a list of questions which, with very slight modifications, was used for the purpose of obtaining the desired statistical information, and copies of this list were mailed to members of the Executive Board, with the request that they endeavor to secure the information asked for, as far as possible. Replies were received during the course of the year from the following gentlemen: H. L. Olds, A. B. Cooke, T. A. Elder, J. S. Dales. Altogether the statistics of 9 gas companies in Indiana and Illinois were received through the efforts of the gentlemen mentioned above. The Chairman of the Bureau of Information, and the Secretary of the Association, wrote several times to individual members of the Executive Board, asking them to furnish the information asked for. I believe it was simply a case of carelessness on the part of the gentlemen who failed to give attention to these requests, and trust they will see fit, during the coming year, to add by their efforts to the information we already have, which it is needless to say will be of great benefit to the industry in the State. The reports, as sent in to the Bureau, will not be incorporated with the "Proceedings," nor published, but will remain the property of the Association, in the hands of its Secretary, available for the use of any member of the Association who has occasion to refer to them. This closes the report of your Bureau of Information, and it is for you gentlemen to decide whether the work done during its first year warrants its continuance.

BUREAU OF INFORMATION, INDIANA GAS ASSOCIATION,
O. O. THWING, Chairman.

Mr. Graf—This is the proper time to give Mr. Thwing a hearty vote of thanks for the work he has done, and to continue him in office for another year, and I make a motion to that effect. [Seconded, and adopted by rising vote.]

The President remarked he would like to continue Mr. Thwing on the job for life. He then noted they had an invitation, issued by the Panama Pacific Universal Exposition, to be held in San Francisco in 1915. He would not read it, but being addressed to the Indiana Gas Association, it was there for the inspection of all. Along this line they wished to take up a matter that Mr. Morehead brought to the attention of the Association the previous evening. He was not sure he clearly understood how Mr. Morehead wished the matter handled, but he asked that someone be appointed as a committee of this Association to serve in connection with other Associations, and the American Gas Institute, at the Gas Congress to be held at the Panama Exposition (San Francisco) in 1915. He did not think it necessary for them to take any other action. It had been intimated that in 1915 each Association was to hold its meeting there instead of in its own State. They had another year to think it over, so it seemed unnecessary to take it up now. If the Association understood it in like manner perhaps it would be wise to take up the subject now.

On motion of Mr. Graf, the invitation of the American Gas Institute that the Indiana Association send a delegate to the Gas Congress was accepted and the President said: The Association has decided to send a delegate, and I presume you include in that action suitable recognition of this invitation. The invitation was sent by the President and Directors of the Panama-Pacific Universal Exposition.

Mr. Cooke—I may be laboring under a misapprehension in regard to Mr. Morehead's statement last night. You speak about letting this run another year. It seemed to me he wanted some one appointed immediately who would continue to act in conjunction with that Committee.

The final determination was that the Association should appoint a Committee to act with the American Gas Institute at a Gas Congress in San Francisco in 1915.

The Vice-President assumed the Chair and the following

REPORT FROM COMMITTEE ON PRESIDENT'S ADDRESS

was read:

Your Committee recommends the careful attention of every member of the Association to our President's very able and timely Address.

The increased opportunities for the development of industrial gas business, in connection with the continued increase in the price of fuel oil, cannot be too greatly emphasized.

The recommendations regarding the new Public Utility Commission law are apropos, and should receive the careful consideration of the members.

Your Committee recommends a vote of thanks to the President for his earnest Address, as well as for his untiring efforts in behalf of the Association during the past year.

F. M. LOOMIS,
A. S. COOKE.

The Vice President moved the acceptance of the report. [Seconded, put and carried.]

Mr. Cooke—I would like the privilege of the floor for a minute. The members of the Association in attendance here this year were accorded a high privilege, and from the expressions heard there is no doubt in my mind as to their full appreciation of that privilege, which, through the kindness of Mr. Graf, was represented by their extensive and instructive exhibition given in the Indianapolis Company's store on Pennsylvania street I wish also to thank representative, Mr. Ream, for the unlimited trouble he must have gone to to get this ready and to demonstrate the appliances as he did. In view of this very kind action, I move a vote of thanks be extended to Mr. Carl Graf and to his assistants who gave us this privilege. [Seconded by Mr. Thwing.]

The President—It gives me a great deal of pleasure to put this motion for a vote of thanks to Mr. Graf and his Company for the splendid exhibition given. [Carried.] Next in order will be the election of new members. I will ask the Secretary to read the names.

The Secretary—The following applications for membership have been received. First I will take the active members, and then the applications for associate membership.

LIST OF NEW MEMBERS ELECTED MARCH 13TH, 1913.

Active Members.

Gordon, L. O., Mgr., Valparaiso Lighting Co., Valparaiso, Ind.
Johnson, W. W., Sup't., Goshen Gas Co., Goshen, Ind.
Cash, B. K., Cashier, Indiana Lighting Co., Logansport, Ind.
Shinnick, G. S., Div. Mgr., Central Ind. Gas Co., Anderson, Ind.
Lawler, R., Mgr., Noblesville Gas Improve ment Co., Noblesville, Ind.
Cox, J. A., Supt., Columbus Gas Light Co., Columbus, Ind.
Willis, J. W., Sup't of Works, Indiana Lighting Co., Ft. Wayne, Ind.
Sebald, H. A., Ass't. to Sup't., Indiana Lighting Co., Ft. Wayne, Ind.
Shepard, I. C., Gen. Contract Agt., Evansville Public Service Co., Evansville, Ind.
Owens, H. G., Div. Mgr., Central Indiana Gas Co., Alexandria, Ind.
Covert, I. C., Sup't., Central Indiana Gas Co., Marion, Ind.
Powers, W. L., Eng., Central Indiana Gas Co., Muncie, Ind.
Milne, D. S., Mgr., Central Indiana Gas Co., Elwood, Ind.
Young, W. H., Sales' Manager, Indiana Lighting Co., La Fayette, Ind.
Whitaker, T. W., Mgr., Indiana Lighting Co., Frankfort, Ind.
North, M. F., Mgr., Indiana Lighting Co., Lebanon, Ind.
Roach, H. L., Mgr., Crawfordsville Water & Gas Co., Crawfordsville, Ind.
Morris, W. B., Div. Mgr., Central Indiana Gas Co., Hartford City, Ind.
Feigler, R. A., Auditor, Central Indiana Gas Co., Muncie, Ind.

Associate Members.

Mason, A., Commercial Floater, Welsbach Co., Gloucester, N. J.
Weadley, W. F., Sales' Mgr., General Gas Light Co., Kalamazoo, Mich.
Pierce, R. F., Mgr., Illum. Engr. Lab., Welsbach Co., Gloucester, N. J.
Mettler, L. B., Western Sales' Mgr., Pittsburg Water Heater Co., Chicago, Ills.
Smith, C. S., Salesman, Ringen Stove Co., St. Louis, Mo.
Travers, P. T., Sales' Agt., Beler Water Heater Co., Indianapolis, Ind.
Enos, C. K., Salesman, National Stove Co., Lorain, O.
Arnold, G. W., Wholesale Salesman, Welsbach Co., Indianapolis, Ind.
Douglas, A. C., Gas Engineer, Evans & Howard Firebrick Co., St. Louis, Ills.
Martin, J. M., Gen. Mgr., Chambers Mfg. Co., Shelbyville, Ind.
Miller, T. D., Spec. Rep. of Western Mgr., Consolidation Coal Co., Chicago, Ills.

The President—This splendid list of applications is before you. The applicants have been accepted, their election is recommended by the Executive Board.

On motion, the Secretary was instructed to cast the ballot in favor of the election of the gentlemen named, and he subsequently reported that the instructions had been carried out.

AN EXPLANATION BY MR. J. H. MAXON.

Mr. Maxon—Mr. Chairman and Gentlemen: The week beginning April 7th the Central Indiana Gas Company will put on an exhibition of industrial gas appliances, which is virtually the exhibition recently put on in Boston, and it will be under the direction of Manager Tracy, of the Central Indiana Company, at Muncie, and Mr. Powers, who will join our organization April 1st as Industrial Engineer. It will include a very complete industrial installation of all types of burners, etc. I wish to extend to our members a hearty invitation to visit us at that time in Muncie. It may also be of interest to you to hear this: That in connection with the promotion of the use of gas for industrial purposes our Company has announced the following rates for gas: Minimum bill, covering payment for 500 cubic feet or any part thereof, 50 cents; first 5,000 cubic feet, gross, $1; net, 90 cents; next 35,000, gross, 85 cents; net, 75 cents; next 460,000, net, 50 cents; next 1,000,000, net, 45 cents; next 1,000,000 net, 35 cents; excess over 2,500,000 cubic feet per month, 30 cents, net.

THE UTILITIES BILL.

Mr. Ray—In connection with the passage of the public utilities bill, I think all our public utility companies have been very anxious to get copies of this new law. While here in Indianapolis I conferred with the Secretary of the Indiana Electric Lighting Association, and found he had printed this law. Within the last few days it has been circulated among their members. Through the courtesy of that Association I can give anyone who wishes it a copy of that law.

On motion of Mr. Cooke (seconded by Mr. Graf) the Secretary was instructed to make suitable recognition of the death of Mr. Atkinson, by spreading a minute to his memory on the minutes; and that a copy of same be sent to his family.

The President then called for the

REPORT OF THE NOMINATING COMMITTEE,

which was submitted by Chairman Loomis, as follows:

Mr. President and Members of the Indiana Gas Association: Your Nominating Committee recommends for election to office the following gentlemen:

For President.—Mr. A. S. Cooke.
For Vice-President.—Mr. A. C. Blinn.
For Secretary-Treasurer.—Mr. P. Eves.
For Directors.—Three-year term, Messrs. B. H. Danforth, J. H. Maxon and W. D. Ray.
Two-year term, Mr. S. E. Mulholland.
One-year term, Mr. O. O. Thwing.

ELECTION OF OFFICERS.

On motion of Mr. Danforth, the report was accepted, and the Secretary was instructed to cast a ballot in favor of the election of the Committee's nominees. The Secretary having announced that the instruction had been carried out, the President called for responses from the newly-elect. Responding to the invitation, Mr. Cook said: Mr. President and Gentlemen: I wish I could adequately express my appreciation of the honor you have conferred upon me. There are a lot of fellows here much more capable of assuming this position. However, I will do the best I can and trust you will bear with me and help me. I feel that this coming year will perhaps be a strenuous one, through the fact that we are about to come under the control of the Public Utility Commission. Just how much that will affect us it is impossible at this time to state, but I fully believe our interests will be conserved if you will work with and for that Commission. I am of the opinion that the men who will make up the personnel of this Commission will be big, broad minded men, who will consider your interests fully with the interests of the public. Therefore, as I say, this year perhaps will be momentous in a sense, and I will expect you to give me any assistance I may ask. I will request Mr. Olds to continue in the Chair until the completion of this meeting.

Mr. Eves—Mr. President and Members: As this is the fifth consecutive time you have elected me Secretary-Treasurer of the Indiana Gas Association I desire to express to you my great appreciation for this high honor, and to thank you for it.

The President called for the

REPORT OF COMMITTEE ON NEXT PLACE OF MEETING,

which was then submitted by Chairman Dunbar:

Mr. President, Mr. Danforth favored Terre Haute, and I inclined to Indianapolis, so we decided to leave this to the vote of the Association.

Mr. Thwing—In view of the fact that Mr. Cooke is our incoming President I believe it would be only courteous and right to him to select Terre Haute as our next place of meeting. While not actively in the gas business I believe it is for the benefit of the gas industry to have this Association meet in some other town than Indianapolis. Indianapolis as the logical center of the State is the easiest place to get to, but for the good of the business and for the good of the fraternity we should go to some of the other towns and give them a boost. The Fort Wayne meeting of the Association 2 years ago was a big boost for the local Gas Company, and I believe it will be a big boost for Terre Haute and for Mr. Cooke, whom we all like personally, to have our meeting there.

Mr. Graf—Mr. Cooke, do you want the meeting at Terre Haute?

Mr. Cooke—I do. [And it was ordered by vote.]

Mr. Cooke—I would like to again express my thanks. I am not going to promise you anything at Terre Haute, and it is perhaps going to put some of you to inconvenience to come there, although we are right on the main line from Indianapolis. We cannot offer you all the comforts you have here, but we have got lots of room. Mr. Thwing voices my sentiments. He didn't go quite as far as I wish he had. The presence of a body of men such as you are in any town is bound to excite interest. It is going to help us locally, and I want the Association to go over the State as much as possible thus letting the people have the advantage of seeing what and who you are. I believe it will have a tendency to make the Association more prominent than if we continue to meet in a place that we, being so small a unit in comparison, are simply swallowed up. I believe further that the publicity we get through the columns of the newspaper in a small town is going to be far reaching to the benefit of the Association.

The President—One other matter I have in mind, is respecting the committee of one to be appointed to confer with the American Gas Institute. If there is no objection, I will put it into the hands of the Executive Board to decide. I take silence to mean consent. In closing I wish to thank you all for your attendance here. I appreciate it very much.

On motion of Mr. Danforth a vote of thanks was extended to the officers of the Association, especially to Mr. Olds, who presided so efficiently over the organization in the past year. [Seconded by Mr. Thwing and adopted.]

On motion the Convention was declared adjourned.

How to Develop the Ideal Complaint Man.

[A paper read by MR. W. F. YARDLEY, at the March Meeting, Illinois Gas Association.]

When asked by the committee to prepare a paper on this subject, I reluctantly, and against my better judgment, agreed to submit one for approval without realizing what I was up against; and the more I thought on the subject the less optimistic I became on the contract I had undertaken, as I find it is often difficult to obtain a real complaint man without aspiring to the ideal. I sought the dictionary for inspiration and found some of the definitions for Complaint were as follows:

"An expression of grief;" "a finding fault;" "a disease."

These definitions led me to believe that, owing to the inconsistency of many of the complaints received, and unless they were promptly and properly taken care of, the fault-finding would develop into a disease and grief would follow for both manager and complaint man. What is more annoying (and no doubt many of you have experienced it) than to have the same complaint from the same location several times, with perhaps a letter from the consumer calling attention to the fact that you have sent a man several times but he does not seem to know what is the matter? The complaint must be remedied eventually; why not on the first visit?

If you should ask a new employee in the office what impressed him most, I think he would answer the number of complaints which are received every day, either by telephone or by people calling at the office. I often thought that the average person who paid a gas bill

(*Continued on page* 258.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, APRIL 21, 1913.

[Official Notice.]

Ninth Annual Meeting, Southwestern Electrical and Gas Association.

Office of the Secretary,
Slaughter Building,
Dallas, Tex., April 5, 1913.

To the Members: The Ninth Annual Convention of the Southwestern Electrical and Gas Association will be held at Galveston, Tex., May 21, 22, 23 and 24—a 4-day meeting, instead of 3 days, as heretofore, the Association having so increased in scope and numbers as to necessitate more time for its proceedings. In addition, it has been found necessary to have "parallel sessions" for the gas members and the accountants, these to "parallel" regular sessions which are on subjects not interesting to those attending the gas and accounting sessions. One full session will be given up, as heretofore, to the "Supply Men," who have promised that it shall not be the *least* interestinng session of the Convention. This will be followed, in the evening, with a "Rejuvenation" of the Sons of Jove, at which the National Deities will preside.

A large attendance is expected from the East and North, two special cars having already been reserved, from St. Louis to Dallas, where it is expected to "hitch on" enough Texas delegates to make a solid "Convention train" from there to Galveston.

The official and definite programme, with list of papers and topics for discussion will be published in a short time. Full information as to railroad rates and routes, hotel accommodation, exhibits, etc., may be obtained by addressing the Secretary, as above.

Yours truly, H. S. Cooper, Secy.

[Official Notice.]

Ninth Annual Meeting, Iowa District Gas Association.

Iowa District Gas Association,
Office of the Secretary,
Des Moines, Ia., April 7th, 1913.

To the Members: The Ninth Annual Meeting of the Iowa District Gas Association will be held in Burlington, Ia., May 7th, 8th and 9th. The headquarters of the Association will be at the Burlington Hotel. Early reservations should be made to secure the best accommodations. Mr. E. D. Clary, Superintendent Burlington Gas Light Company, Chairman of the Committee on Arrangements, will make reservations on request. The following papers are promised for the meeting:

"The Prepayment Meter" (an answer to Mr. Weisgerber's paper of the last meeting); by Mr. Thos. Crawford.

"The Welfare of the Employee," by Mr. G. W. Clabaugh.

"Operating a Store Room," by Mr. W. H. James.

"Recent Developments in Industrial Appliances," by Mr. E. C. Weisgerber.

"Advertising," by Mr. Fenton P. Kelsey.

"Improving Operating Conditions for the Small Works," by Mr. H. G. Stillson.

"Reducing Boiler Fuel in Water Gas Manufacturing," by Mr. T. B. Genay.

"Some Distribution Experiences," by Mr. W. H. Merritt.

Mr. E. G. Pratt will discuss the oil situation. In addition, the following Standing Committees will report: Manufacturing, Distribution, Construction, New Business, and Public Relations.

On May 8th, the convention will go by steamer, on the Mississippi, to Keokuk, returning the same evening. One session will be held on the boat. The afternoon will be spent inspecting the new dam and power plant. Other attractive entertainment features are being arranged.

G. I. Vincent, Secretary.

[Special Editorial Correspondence, by Telegraph.]

FIFTH ANNUAL MEETING, SOUTHERN GAS ASSOCIATION.

Hotel Selwyn, Charlotte, N. C, April 18, 1913.

Dear Journal: With the addition of 40 new members, the Southern Gas Association "showed strong" at the opening of its Fifth Session, the morning of last Wednesday. When Mr. E. C. White, the clever President of the Association, called the session to order at 10 A.M., he faced a gathering of 100 "gas scouts," recruited from all sections of the sunny, prosperous South. Of course, all the active officers were on hand, and three former Presidents also added the dignity of their presence, in the persons of Messrs. Congdon, Frund and Hoyt. The only "Tom." D. Miller, formerly, as you know, of New Orleans, and First President of the Association, was enthusiastically elected to Honorary Membership. Time does not seem, in its flight, able to "wing him" in the slightest degree. Four cities made bids for the next convention; but the fortunate one "in the draw," was Mobile, Ala., in which home of the Cotton Kings we will bring off the 1914 sessions. Take it from me that Charlotte is a live, hustling, growing city (it now holds 50,000 people) and it goes without saying that the staff of the Charlotte Gas and Electric Company proved themselves happy and hospitable hosts. The entertainment features were the "fixings" fitting to a nicety the requirements of the men who make and send along in darkness the mysterious currents that, at the turn of a tap, turn night into day, that fit food for the table of the high and low, that drive the wheels that sing the song of industry. The Greater Charlotte Club has shown us that Charlotte grows apace, and its officers have spread it that the local Gas Company helps mightily in the growing. Everybody seems to have had the time of his life; and perhaps none more so than Mr. C. E. White, who was unanimously chosen representative to the World's Gas Congress, at San Francisco, in 1915. To tell the truth, the White presidential address (and it surely was a "stirrer") was the motor that caused this appointment. The following officers were elected:

President.—James Ferrier.
First Vice-President.—Mac. D. Dexter.
Secretary-Treasurer.—E. D. Brewer.

The weather was fairly good, the attendance was excellent, the enthusiasm was unbounded, wherefore the meeting was successful.—E. D. B.

[Special Editorial Correspondence, by Telegraph.]

ANNUAL MEETING, MISSOURI ELECTRIC LIGHT, GAS, WATER WORKS AND STREET RAILWAY ASSOCIATION.

Coates House, Kansas City, Mo., April 18, 1913.

The annual meeting of the above-named Associati on was held in the Coates House, Kansas City, and convened here in due form, with Vice-President J. E. Harsh, of Joplin, Mo., in the Chair. The substitution was necessitated by the unfortunate absence of the President, Mr. P. A. Bertrand. However, we were all fortunate enough to have from Chairman Harsh an address that did not savor of mincing in the advice put before the industries of the State, which the Association aims to conserve as well as advance. His arguments in favor of better Association work are surely bound to result in its advancement. There was a fair attendance; but the papers read were of a nature that would not particularly interest gas men, although of undoubted value to the other branches of the body. The

executives will likely have to wrestle to a termination with the project of holding the 1914 convention aboard boat on Mississippi river *en route* to the famed "Keokuk Dam." The entertainment, which was most enjoyable, included a theater party, a fine automobile trip and a most enjoyable banquet. The supply men are here in good numbers and the spirit of fraternity was surely shown in potent measure. The convention will practically come to a close at noon to-day.—F. H. G.

BRIEFLY TOLD.

ANNUAL MEETING, SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION.—In a communication to us, under date of the 13th inst., Mr. H. S. Cooper, Secretary of the Southwestern Electrical and Gas Association remarks that, in so far as the executives are concerned, all that it was possible for them to do, in connection with the meeting in Galveston, Tex., May 21st to 24th, inclusive, has been done to cause the meeting to be a most successful one. So he declares that it is "now up" to the gas men of the Lone Star State to cause it to be such. This they can best do by attending in full numbers, primed to take active part in the discussions on the regular papers, and in dissecting the matter in the question box. He explains that sessions have been so arranged that those devoted to the gas industry will not conflict with the ones allotted to the other considerings within the scope of the Association's work. Thus no gas member will be deprived of opportunity to be present at the general sessions, during which matters of moment to every public utility will be discussed. Instructive and interesting papers on present day, actively live gas topics are being prepared for presentation, a list of which will come to hand in ample time for publication in the JOURNAL, thus enabling those interested in a special subject to prepare themselves for a debate that will benefit all. The "Question Box" is sure to be pretty well filled with "gaseous nuts" more or less hard to crack. Mr. Fred. H. Gurtler, of Gurtler, Lockwood and Johnson (Chicago) will report the meeting in person, which insures an accurate and quick transcription of the doings. The Secretary's office has given much attention to the details ef the meeting. So also has Mr. Marion Douglas, Chairman of the Committee of Arrangements. The headquarters and convention room are to in the commodious Hotel Galvez, which hostelry is on the European plan, with an excellent dining room and first-class kitchen as useful adjuncts. The rates there are thus established: Single rooms, $2; single room, 2 persons, $3; single room and bath, 1 occupant, $3.50; 2 occupants, $4; suites, with private baths, $10. Then there are these other hotels to choose from: The Tremont, the Panama, the Royal and Beach Houses, at varying rates. Mr. Douglas advises that his Committeemen will be heartily pleased to make reservations and to furnish such other information as desired by members.

APRIL MEETING, ILLUMINATING ENGINEERING SOCIETY, NEW ENGLAND SECTION.—Mr. H. C. Jones, Secretary, New England Section of the Society, informs us that the next meeting will take place this evening, at 8 o'clock, in the Auditorium of the Edison Illuminating Company, 39 Boylston street, Boston. Dr. Louis Bell is down for a paper on "Notes on the Effect of Radiation on the Eye." It is promised that this paper will embody the results of considerable study and investigation by Dr. Bell, who has been engaged in work along these lines for quite a while. The paper, further, should be of value to all interested in artificial light sources, since it will include a narrative of the effects of both infra-red, visible and ultra-violet radiation. Again, it is of general interest to any student or observer of the effects physiological of light on the human eye.

SEVENTEENTH MEETING, NEW YORK SECTION, "THE GAS MEETERS."—Secretary Jno. M. Brock informs us that the first Ladies' Night in the history of "The Gas Meeters" will be brought off at 7 P.M., 24th inst., in Churchill's Restaurant, Broadway and 49th street. As it is important to know sufficiently in advance to permit of the completion of the necessary preliminaries, Mr. Brock urges upon all those proposing to attend that they notify him at once of such intention. In closing paragraph, he remarks: "Suit yourself about the clothes you wear; glad rags or regular suit, just as you wish. A $5 bill covers the expense for yourself and lady; and extra tickets for lady or gentleman will be billed at $2.50 each.

CURRENT MENTION—

A BEAUTIFUL ceremony was the wedding service, in St. David's Church, Roland Park, Baltimore, Md., early the evening of the 19th inst., which united in marriage Emilie Louise Dickey to Mr. Oscar William Johnson. The bride is the daughter of Mr. and Mrs. Charles Herman Dickey, of Baltimore. May they ever happy be. Mr. and Mrs. Johnson will be, after the first June, at their home, 179 East Chestnut street, Chicago. Mr. Johnson is a prominent business man of the famed Western Metropolis.

THE Koppers Company is under contract to construct a by-product coke oven plant for the Laclede Gas Light Company, of St. Louis, Mo., at a site right at the mouth of the River des Peres. The estimated cost of this undertaking is $5,000,000.

THE proprietors of the Peoples Gas Light and Coke Company are also arranging for a mammoth plant of the coke oven type, which it is said will be the largest of its kind in the world.

Book Reviews.

"*Regulation, Valuation, and Depreciation of Public Utilities,*" *by Samuel S. Wyer, M. E.*, published by Sears and Simpson Company, Columbus, O.; 313 pages; flexible covers, illustrated; price $5. This book is not a brief for either the Public or the Public Utilities, but is a discussion and compilation of pertinent, economic, engineering and legal facts relating to both sides. It is a discussion of basic principles, with digested opinions of experts and judicial decisions of our Courts. It is an encyclopædia for the man that reads or writes on the subject of public utilities.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

"*The W. M. Crane Company's New Catalogue.*"—An advance copy of the new catalogue of the William M. Crane Company is before us, and it is a surety that the book will find a ready demand in gas circles. It is handsomely printed, on good quality paper, and is bound in strong boards covered with red canvas. In contrast to most appliance catalogues, it is printed from left to right, not from top to bottom. We think it worth while to recommend every gas man having a copy of the preceding catalogue, "Vulcan," to write for the new issue. It contains new list numbers, new prices, new sizes, new goods—indeed, it is new in every respect. Amongst the new goods shown in the catalogue is "Toaster No. 710." This novel appliance is equipped with two separately controlled burners, and is just the thing for fish, oysters, clams, scallops, toast, etc. It should find favor with restaurant and boarding house keepers for rush order work. A great deal has been heard of late concerning the new "Vulcan" confectioners' stoves, and the No. 690 has certainly proved its value. An addition has been made to this line and the No. 695 is now introduced to fill the demand for a more powerful stove. The Crane folks say it will positively make hard candy without a blast. A further addition is made to the line of tank water heaters, thro ugh the agency of the No. 198 "Vulcan" boiler. This apparatus is equipped with spiral copper coil, and a powerful burner, which delivers 5 gallons of water in 12 minutes at 150° F.; evidently a useful boiler for barbers and the like. The usefulness of the modern "School of Cookery" is now being generally recognized by the trade, and the catalogue includes an illustration of a new "School Stove." It is listed in two sizes, and the "Vulcan" people intimate their willingness to make it in any length, up to 8 feet. Altogether, even if on the trade order, the new book should interest every gas man.

"*Consolidation Coal Company.*"—A 30-page booklet describing very interestingly the mines, coal, and their characteristic utility. It is fully illustrated. The subject of coal is just now of much interest to the gas industry.

"*Reliable*" *Gas Stoves and Ranges, Catalogue No. 50 for* 1913.—This Catalogue is one of the most complete we have had the pleasure of examining. Consisting of over 80 pages, 6 inches by 9 inches in size, each page describes one specialty, either stove, range, water heater, hotel or restaurant range, etc. It is bo und in a heavy cover, very attractively gotten up.

"*Michigan Gas Association, Proceedings, 21st Annual Meeting, Toronto and the Thousand Islands.*" The volume, which contain- a complete account of the last annual meeting, is a conveniently arr n-ged handy reference. In fact the get up reflects much credit on the Association's competent and versatile Secretary.

"*Bristol Bulletin, No.* 169."—This pamphlet, describes the new Bristol Set-Back Counter, which can be quickly and easily set back to zero position.

"*Estate Gas Appliances, Forty-Seventh Series Catalogue.*"—This Catalogue is really an 8 by 11-inch bound book. Each of its 136 pages is devoted to a close description of Estate Appliances, and each is fully pictured. The whole arrangement conveniently and simply presents the meritorious features of the Company's wares in plain language, tersely put.

(*Continued from page* 255.)

at the office felt that he was overlooking a privilege unless he registered some kind of a complaint; and what a variety of them there is! You are all familiar with them: "Poor gas," "poor pressure," "high bills," "appliances not connected properly," "stove burners light back," "wrong meter reading," impertinent employees," "leaks," etc.

No matter how foolish the complaint may seem to the clerk taking the order, or to the man sent out to take care of it, in the majority of cases the consumer really thinks or knows something is wrong and is not making complaint simply for the purpose of finding fault, hence the importance of having a complaint man who is diplomatic enough to look at the complaint from the consumer's standpoint and apply the remedy or explanation needed.

I have a case in mind to which the foregoing statement will apply. Some time ago a lady telephoned in a complaint, saying: "What is the matter with the gas? I cannot get any heat at the top burners of my stove?" We assured her there was nothing the matter with the gas and would have a man call as soon as possible. Upon his arrival he found that all of the mixers on the stove had been filled with plaster of paris, and upon inquiry found that the lady of the house had paid $2 to a man who promised to save at least one-third of her gas bill each month; he simply filled up the mixers, collected his $2 and departed; of course, the complaint man explained to her while he was at work the necessity for having the opening clear so that the proper adjustment could be made, and the time he had finished his work had made a friend for the Company instead of a kicker, which might easily have been done had be laughed at her for a "Mrs. Easy Mark." Now, how are we going to get men educated to properly take care of this very important part of the business, for as long as we sell gas and collect bills we are going to have complaints? I have often contended that the best men on the job should be in the complaint department. They must be diplomatic, courteous, obliging, ready to do everything possible to satisfy and convince a consumer that the company is more than willing to investigate and correct any trouble; and persistency should be their middle name. The company naturally is judged by the men who come in contact with the public, and the complaint man is under surveillance as much if not more than any other employee.

Lectures and schools of instruction may be of importance, and no doubt are beneficial, but these with many companies are out of the question owing to the comparatively small number of men employed. It is often necessary with a small company that men cannot be kept in one department, but must be used wherever there is work to be done, and here, in my opinion, is where the ideal complaint man can be trained. I think it advisable that he should spend some time in the meter shop, at least enough to know and understand the manner in which gas passes through the meter, how it is registered, capacity of meters, how meter connections are made, etc., information that will be useful to him every day. Then for a time as lamp trimmer and statement taker; on this work, by the practical experience obtained in a short time, he will learn more than could be acquired through lectures and occasional demonstrations in months. He will also be impressed with the fact how important it is to get all meter statements possible, and get them correctly or give good reasons for not doing so.

He is now ready to go out as a helper; but be sure that he goes with a good fitter, for a poor fitter will never develop a good helper, Here he will get experience that will be invaluable in his future work, setting meters, and, if on a high pressure system, setting regulators, connecting stoves, water heaters, arc lamps and every other kind of appliance. He will see the importance of a good supply of gas, and the necessity for proper adjustment of the various appliances, how the work tickets should be filled out, showing all material used, time required to do the work and the necessity of an explanation of anything unusual, so that it is intelligent to any one who should have occasion to refer to it at any future time. I think this proper filling out of tickets cannot be impressed too strongly. Of course, I realize that fitters and helpers are not supposed to be clerks, but my experience has been that the average man seems to have an aversion to give you any information on his work ticket that can be avoided.

After a period as helper, our man should be ready to go out as a fitter and learn to assume responsibility and to lay out his work to the best advantage. He may be called upon occasionally to take pressures; and here is another matter that ordinarily the average complaint man knows nothing about. What pressure is carried in certain districts, or how much gas per hour should be consumed through any burner of a gas stove, or the necessary size orifice to supply the burners under normal conditions.

I think any man who has been through this routine, having worked conscientiously and been encouraged to do his best work, will make an ideal complaint man so far as the mechanical requirements are concerned. Whether you can make a diplomat out of the average fitter I have serious doubts, but if the two can be combined our ideal complaint man is assured; and I think you will agree that, at any rate, complaint work is a man's work and a case of the survival of the fittest.

Before concluding, I would like to call attention to the necessity of co-operation between departments, and this is especially to be desired so far as the complaint department is concerned, for naturally the complaint men should be in close contact with all departments.

Petty jealousies often arise between departments or department heads, which not only waste time and are absolutely needless, but also prevent what is most to be desired, efficient service.

We may see some line of work in another department, which from our point of view might be handled to better advantage for everyone concerned, but hesitate to make suggestions for the reason that our motive may be misinterpreted, and we be accused of "butting in" on something which did not concern us. This is all wrong, for whatever affects one department affects the entire organization, and the manager or superintendent who is trying to render the proper kind of service will gladly welcome suggestions or criticisms. If they be worthy of consideration the employee should receive proper recognition; if the suggestions are not desirable he should also be shown why it is not possible to adopt them; but this should be done in such a manner that he will not hesitate to advance ideas in the future which may be for the good of the service. In taking orders, either at the complaint window or by telephone, the party taking the order can often obtain information which may be helpful to the man sent out to do the work, if he will only show the consumer he is interested in what he has to say. The order will then be made out properly and intelligently and the complaint will then be a means to an end instead of, as so often now considered, a necessary evil.

Utility Commission for Indiana.

The Indiana State Legislature has passed a law, effec.ive May 1, creating a public service commission.

The measure defines public utilities including street railways, interurban railways, telegraph and telephone companies, heat, light, water or power companies and elevator and warehouse companies. Steam railroads are not called "public utilities" under the law, but are continued under the railroad commission law which is given to the new commission to enforce.

The Indiana law follows the Wisconsin law in many ways and is in some respects similar to that of New York.

Interurban lines which in part are regulated by the old railroad commission law, are defined as public utilities under the new law. In the matter of valuation it is provided by the new law that where interurban lines are physically valued by the Interstate Commerce Commission, the Indiana Public Service Commission may accept the physical valuation made by the Interstate Commerce Commission. In addition it is provided that in valuing utilities the Indiana Commission, "as one of the elements in such valuation shall give weight to the reasonable cost of bringing the property to its then state of efficiency."

One important point in the law is that it provides for a valuation of all utilities. The law says the commission "shall value" the utilities. Valuation is to be one of the things on which the commission must base its rates, charges and tolls in the future when it comes to regulating the utilities of Indiana.

The law gives the utility an appeal from an order of the commission to any Circuit or Superior Court of the State and to the Appellate and Supreme Courts, giving the Appellate Court power to determine appeals transferred from the Supreme Court.

Ten citizens or any civic body or council may complain to the Public Service Commission against the service, charges, rates, tolls or fares of any public utility, and the commission is empowered to alter schedules, after proper hearing, and to enforce its orders. The law provides for the publication of rate sheets by utilities companies.

The law provides for speedy action on cases appealed from the commission to the courts, giving such cases precedence over civil cases.

In the law it is set out that new evidence presented in court on appeal shall be sent back to the commission to be considered in a new hearing before it.

There is a provision for indeterminate permits for utilities. This indeterminate permit is to be issued to the utility by the commission in place of the existing franchise or grant held by the corporation.

Where local conditions or bond issues made subject to an existing franchise prevent a company from accepting the State's new indeterminate permit, the utility still is subject to the commission in all other matters. The commission will have the power to keep competition out of a field where public necessity does not, in the judgment of the commission, demand that additional utilities be allowed to do business. In other words, a certificate of public necessity issued by the commission will enable a utility to go into a field where there already is service of the kind it plans to give, but if any existing company can show there is no necessity for competition, it can hold the territory.

Under one provision of the law it is set forth that no city can go into the business of supplying service where there already exists a utility under an indeterminate permit furnishing like service. At the same time it is provided that a city may take over a public utility plant and service under the supervision of the commission and at a purchase price fixed by the commission. A municipality, under the law, could enter into competition against a utility which does not hold such an indeterminate permit.

The law provides that no license is to be issued or transferred except to a corporation duly organized under the laws of the State of Indiana or to a citizen of the State. All franchises hereafter issued are to have the effect of indeterminate permits and are to be subject to revocation by the commission for cause. In section 100 of the bill it is set out that where a municipality seeks to buy a public utility the utility must sell to the city at the value and according to the terms and conditions fixed by the commission.

There is a provision also to the effect that in the event the new law is found to be invalid, or is annulled, the utilities operating under the indeterminate permit system shall receive back the grants of franchises they have surrendered, and continue thereafter under those old grants, provided, that in such cases no returned franchise shall run for less than 5 years.

Under the plain declaration of the new law all the franchises now existing which contain any terms interfering with the existence of a utility are declared "against public policy," and the law amends such franchises competing to permit any city to grant a permit to a second utility corporation.

Up to July 1, 1915, any existing public utility may surrender its present franchise to the municipality and receive in exchange therefor an indeterminate permit as provided for by the new law. The acceptance of an indeterminate permit carries with it the utility company's consent to a future purchase of its plant by the municipality under the supervision of the commission. It also accepts conditions as to revocation of the permit by the commission for cause.

Matters of Rates amd Charges.—In the matter of rates and charges of rates the new law defines unjust, unreasonable and unlawful charges. In section 7 is a provision which would prevent a company now operating under a regulatory franchise from charging more than the rate fixed in such maximum franchise, even though the rate-fixing franchise be surrendered and a new indeterminate license be taken. This provision says:

"Nothing in this act contained shall authorize any public utility during the remainder of the term of any grant or franchise under which it may be acting at the time this act takes effect, to charge for any service in such grant or franchise contracted, exceeding the maximum rate or rates therefor, if any, that may be fixed in such grant or franchise."

One provision of the new law requires telephone companies to make physical connections for interchange of business, under the eye of the commission, where the companies disagree as to terms.

Stocks and Bonds.—Important among the provisions of the new law is its attempt to solve the "stock-watering" problem. It provides for uniform bookkeeping, reports to the commission by the utilities, and for examinations and surveillance.

No stock can be issued at a discount or at a premium except with the approval of the commission, and if sold at a discount the commission shall make a record of the fact and shall give the matter such publicity as it deems necessary. There is provision to prevent the issuing of bonds at less than 75, but in the case of bonds authorized, but not issued before Feb. 1, 1913, it is provided that the bonds may be issued as low as 65 cents on the dollar.

The commission may consent to the issue of refunding bonds to take up issues made after Feb. 1, 1913, but no such refunding bonds may be put out without the consent of the commission.

Under the law the public utility wishing to issue stocks or bonds must obtain a certificate of authority from the commission. The certificate will set out the amount and character of the issue and the purposes thereof and the service or property to be acquired.

It is provided in section 92 that the commission may consent to the issuing of securities to raise money to reimburse income funds for moneys used heretofore for extensions or additions. But the utility must apply for such consent before Jan. 1, 1915.

The law declares that the commission shall have power to impose any reasonable conditions upon a utility in the issue of securities. The commission is to have controlling power over mergers, and there can be no mergers of utilities except under an order of the commission, after a hearing. It is also required that three-fourths of the stookholders shall consent on each side of the deal and that non-consenting stockholders shall be paid in cash for their holdings at prices fixed by the commission.

In section 18 there is a provision which requires that general and executive officers and a majority of the directors of a utility corporation shall be bona fide residents and citizens of the State of Indiana while acting as such officers or directors.

Salaries of Commissioners.—The commissioners are to get $6,000 a year. A general counsel, who is to serve Commission and the Governor jointly, is to have $6,000 a year. A secretary is to have $3,600 and a clerk is listed at $3,000 a year. The Commissioners will give bond of $10,000 each.

With the advice and consent of the Governor, the commission is authorized to appoint additional counsel or attorneys, engineers, examiners, experts, clerks, accountants and other assistants and to fix their compensation. The commission is to organize within 30 days after the law goes into effect. The commission is also to select its secretary and chief clerk.

Under the law penalties are fixed in cases where public utilities give rebates, discriminate in favor of certain patrons as against others, enforce preferential rates or tolls or charges, or violate orders of the commission. There are provisions against unauthorized charges and against charging less than scheduled rates. The rebate receiver also comes under the penalty clause of the law. The penalty features cover all possible failures, neglects, violations and offenses against the rulings of the Commission.

New Methods and Appliances.

THE HUMPHREY GAS IMPULSE PUMP.—The pumping plant of the new Chingford (England) reservoir marks a new departure in water works operation. It consists of 5 Humphrey pumps, in which the water is raised by the pressure of expanding gases directly upon the surface of the liquid. The pumps have no pistons or other moving parts, except the valves and valve control, and are the invention of Mr. H. A. Humphrey, M.Inst.C.E., and were constructed by the well-known firm of Siemens Bros., of London. The pump works on the Otto 4-cycle principle, and its operation is made quite clear by these diagrammatic illustrations that we take from the *Journal of Gas Lighting*.

Fig. 1, which illustrates the simplest type of the pump, consists of a pipe *P*, connected by a bend to the combustion chamber *C*, and at its other end to an expanding cone *T*, which latter extends to the level to which the water is to be raised. Suppose the system full of water, and an explosive mixture of air and gas in the upper part of the combustion chamber. The admission valve *A*, exhaust valve *E*, scavengering air valves *S*, and the water inlet valves *V*, are all closed when the gas is ignited. The expanding gases drive the column down and through the pipe *P*, and up into *T*. When the pressure in *C* has fallen to about that of the atmosphere, the exhaust valve *E* opens automatically and there is no force acting on that end of the water column; but the momentum of the water carries it further forward, causing a partial vacuum in *C*. The check valve *N* prevents the exhaust from being drawn back, and the vacuum opens the scavengering air valve *S* and the inlet valves *V*. Most of the water entering through *V* is carried along by the outwardly moving column, but a portion of it rises in *C* to the level of *W*, partly exhausting the products of combustion. When the momentum of the moving column

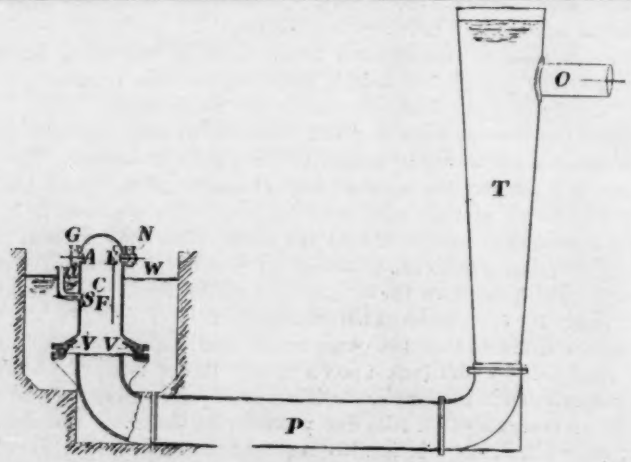


Fig. 1.

of water is expended the valves *V* close and the column comes to rest, but only for a moment, as the level in *T* is higher than *W*, and both are open to the air; so the column of water starts to flow back, driving out the remaining products of combustion, until it rises to the level of the exhaust valve *E* and closes it. A small cushion of burned gas diluted with scavengering air is thus trapped above *E*, and is compressed by the still moving column of water. This cushion is compressed until its pressure is greater than the static head of the column of water in *T*, and then expands giving the second outstroke. Again, the momentum of the column carries the level in *C* low enough to create a slight vacuum when the inlet valve *A* is opened and a fresh charge of air and gas drawn in. A second instroke of the water column compresses this charge. It is then exploded and the cycle is repeated. The steps in the cycle follow each other rapidly, and the valves open and close automatically, needing only a locking device to release the inlet and exhaust valves alternately. The partition *F*, shown in *C*, inclosing the exhaust valve *E*, is open at top and bottom, with its lower end always under water. Its purpose is to direct the scavengering air toward the top of the combustion chamber, in order to have a good proportion of air in the entrapped cushion.

Fig. 2 shows the outlines of a suction pump, the main difference in

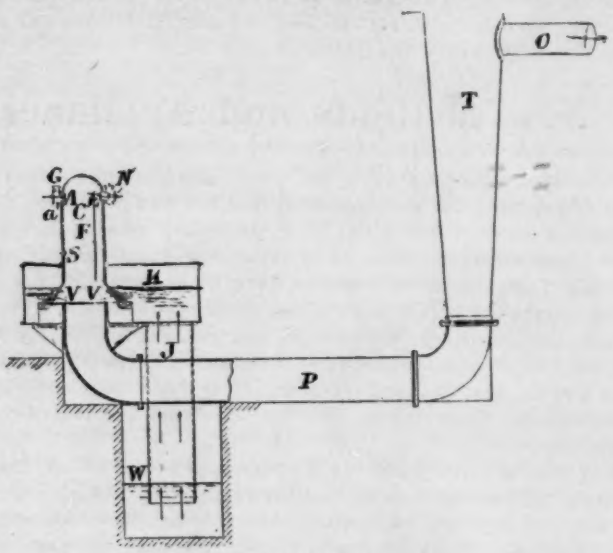


Fig. 2.

form just described at length being the addition of the closed tank *K*, surrounding the inlet valves *V*, and the fitting of a spring to the scavengering valve *S*, designed to prevent its opening until the vacuum in the combustion chamber is low enough to lift the water through the suction pipe.

Fig. 3 shows the high-lift pump. When the pumping head is greater than the mean pressure of the explosion, it is necessary to store energy in a trapped air space. On the delivery end of this pump, instead of the water tower *T*, there is an "intensifier," *H*. On the outward swing of the water column the air valve, *R*, is closed by the rising water and the air trapped in the space *H* is compressed equal to the head, and then water is delivered through the valves, *D*, into the closed tank, *M*, and is raised through *O* by the expansion of the trapped air. As the column comes to rest, the valves *D* close and

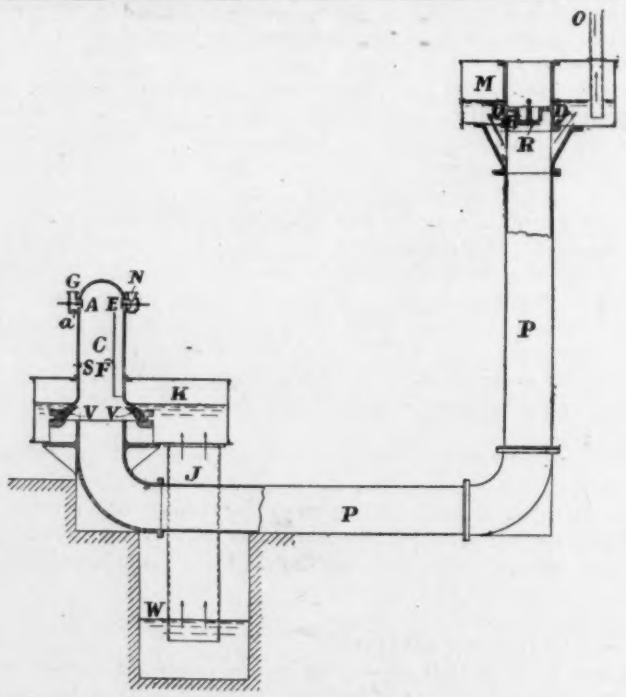


Fig. 3.

the water starts to return. When the pressure in *H* falls to that of the atmosphere, the valve *R* opens again.

Four of the pumps at Chingford are of 40 millions gallons capacity, and one is of 20 millions capacity, the combined output equalling 180 million gallons per day.

Fig. 4 shows the 7-foot diameter, combustion chamber casting for

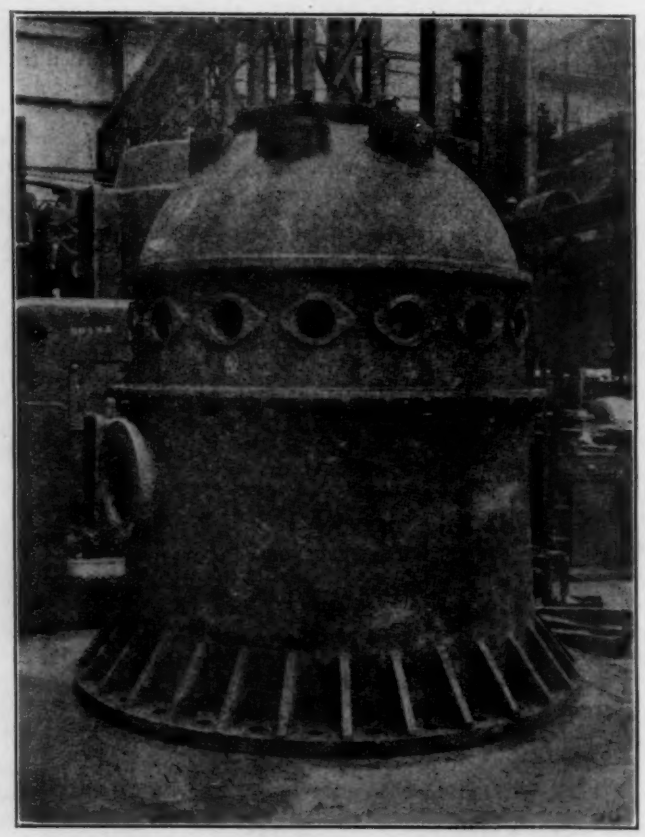


Fig. 4.

one of the larger pumps. The horizontal pipe *P* in this pump is 6 feet, and the cone *T* is 15 feet in diameter at the top, and the pump delivers 12 tons of water per explosion. While this is the first water works installation of these pumps, they are in use in a number of places handling sewage and water for irrigation purposes.

THE FRANCKE FLEXIBLE COUPLING.—The Smith-Serrill Company has put on the market a flexible coupling, known as the Francke, which is meeting with much favor. Being made in sizes, from a

minimum for a ¼-inch shaft to any desired maximum, its field is virtually the entire industrial field. Gas engineers will find it useful in connection with gas engines, steam engines, pumps, blowers, gas turbines, and the like. It has the merit of great simplicity, being merely an ordinary flange coupling connected by flexible instead of rigid bolts. The flexible pins, shown in Fig. 4, are of tempered steel

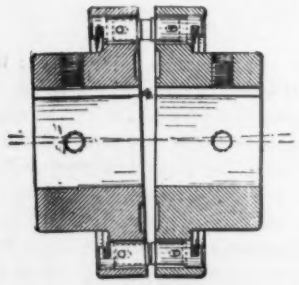


Fig. 1

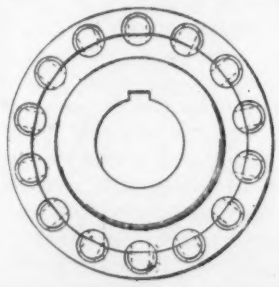


Fig. 2

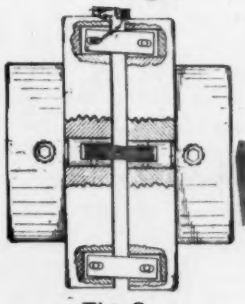


Fig. 3

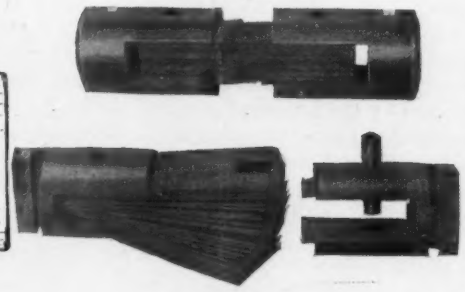


Fig. 4

leaves, secured at each end by a keeper, to prevent loosening, etc., which arranging causes each pin to act as a flexible bolt. The keepers are slotted at each end to engage spring rings, which also fit in a groove in the coupling flanges. They hold the leaves in a radial position for driving, as seen in Fig. 2, and also cause the "keepers" to remain stationary in the coupling flanges. All the leaves, save two short ones, are slotted at each end, as shown in Fig. 4. The short ones being held stationary, all the movement comes on the tempered steel leaves. The slotted leaves (there are many of these) perform the driving and distribute the work over a large area of hardened steel, the slots permitting the coupling to adapt itself to any misalignment. When running the leaves act quite like those of a carriage spring, with like reliability and the certainty of prolonged wear. With shafts out of line, the coupling will often run open on one side and shut on the other, as in Fig. 1, and few other types of coupling will permit this without excessive wear; and, oftentimes, the rigid type of coupling will burn out bearings and even fracture shafts forced to run out of line. The Francke coupling permits shafts to run out of line without dangerous strains on bearings. When shafts are out-of-center (Fig. 3) the pressure caused by two shafts struggling to run on a common center is very trying on the bearings; but the Francke device lets each shaft run on its own center. Further, no expense is caused for perfect alignment. The power transmission also is as great as that with rigid coupling of equal size. Fig. 4 nicely shows the long leaves that do the driving; also, the slots which hold the keepers in check by means of the spring rings. Little or no strain comes on the small hardened steel pins that hold the leaves in the keepers; all movement is on hardened steel leaves; and there is no movement on flanges or keepers. The device is found to meet with favor, both in respect to its efficiency and economy.

NEW LINE OF BRISTOL RECORDING DIFFERENTIAL PRESSURE GAUGES.—A new line of recording differential pressure gauges has been developed by the Bristol Company, Waterbury, Conn. Some of these recorders have been in successful service since the preliminary models were sent out (1908), and the design and construction of the instruments are based on results obtained in actual service during the last 4 years. These recording gauges are designed for use in connection with Venturi meters, Pitot tubes, orifices, combinations of orifices and pilot tubes, etc., to record velocities and volumes of air, gas, steam, water or other liquids flowing through pipes. They may also be used to advantage for recording differences and variations of liquid level in steam boilers, pressure tanks, filter beds, process kettles, etc.

The fundamental principle employed in the construction of this gauge is that one pressure is applied to the inside of the operating tube, the other being applied to the exterior of the tube within a closed casing. In order to record the movement of the pressure tube it is necessary to transmit its motion to the outside of the casing. As the differential pressure to be recorded is usually small (compared with the static pressure), the operative force is correspondingly small, and it is impractical to use a stuffing-box around a shaft passing through the casing, on account of the friction. To avoid the use of a stuffing-box, a unique frictionless sealing device is employed, as described below.

Fig. 1 shows the exterior of one type of these recorders, and Fig. 3 shows part of the interior construction of the spring tube type. In Fig. 2, pressure tube 15 is of the hollow, helical type, used with great success for many years in Bristol recording pressure and vacuum gauges. One of the pressures is applied to the interior of this tube through the pipe 24, and the other pressure is applied to the exterior of this tube through the pipe 25. It will be noted that the pressure tu be 15 is entirely inclosed in the pressure tight casing 22. The movement of the pressure tube will be in proportion to the difference between these two pressures, and this motion is transmitted to the recording pen arm, 12 (outside of the pressure casing), by means of small shaft, 26, through the long tubular sleeve, 27. The capillary action of the oil or liquid between the sleeve and shaft makes this patented joint both frictionless and pressure tight.

Fig. 1.

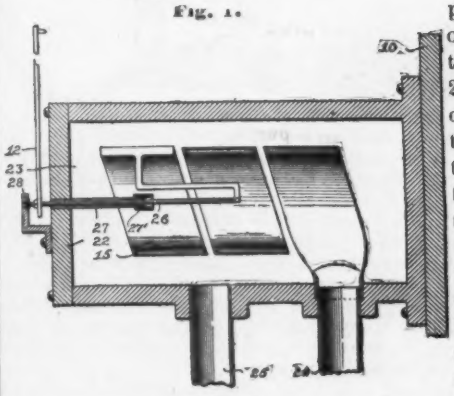


Fig. 2.

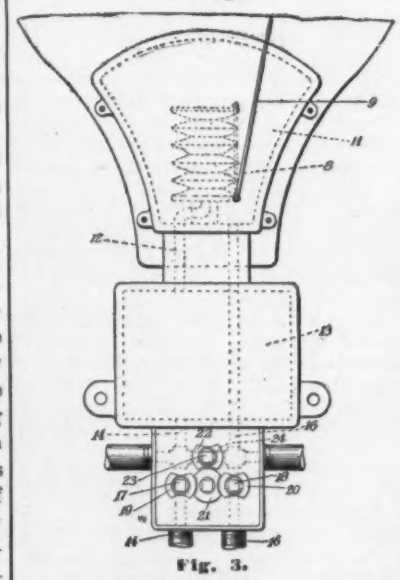


Fig. 3.

This patented device permits the recording of extremely small differences between pressures inside and outside of the pressure tube, as it has been found that the simple sealing sleeve through which the pen arm shaft passes does not produce appreciable resistance to the rotation of the shaft.

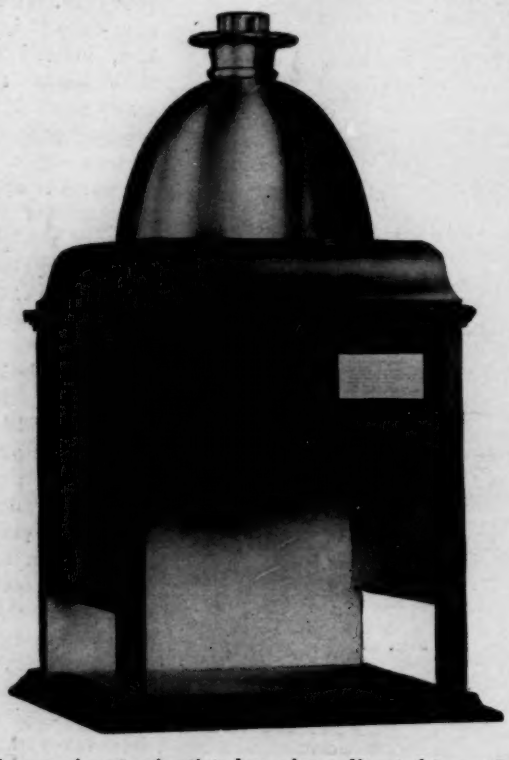
In Fig. 3, diaphragm tube 8 is shown in the pressure chamber of the casing 11, directly connected to one end of the rotating shaft passing through the patented sleeves, its other end being connected to the recording pen arm, 9.

This diagram also shows a set of interlocking valves 17, 18 and 23, which constitutes a device for adapting recording differential pressure gauges to practical operating conditions. Cross-valve, 22, is shown open, connecting the two pressure pipes; valves 17 and 18 in the pressure pipes are shown closed. These latter valves can be opened allowing the static pressure from either pipe

to be applied simultaneously to the inside and the outside of the pressure tube. The interlocking member, 21, can then be turned through an angle of 90°, making it possible to close valve 22, which completes the connections so that the instrument will record the difference of the two pressures.

There is a need for these instruments in many industries, and this field of usefulness is rapidly growing.

A Real Daylight Producer.—The Ives' "Daylight Producer," as it is termed by its promoters, they claim is likely to fill an important field of usefulness; at any rate, it adds another use for gas, thus giving the gas man an aggressive weapon with which to show the superiority of his lighting agent. For many years the efforts of several of



the world's prominent scientists have been directed towards the simulation of average daylight for the matching of colors and tints, realizing that the production of such a light would undoubtedly mean the saving of many dollars. Devices have been invented which produced light quite similar to day rays, but it seems to have remained for Dr. Herbert E. Ives to virtually solve the problem. In this new daylight simulator the Doctor seems to have solved the problem of continuous average daylight, a matter that means the great advantage of uniformity and the greater advantage of being dependable, because always ready for immediate use. Dealers in fabrics, paints, wall papers, cigars, ornamental glass, dyes, inks, textiles, printers, jewelers and lithographers, scientists, etc., will find this absolutely indispensable in their business. Dr. Ives' invention makes it possible for anyone engaged in a business or profession, where there is need to compare colors and tints, as for instance in a drygoods store, to do so with ease and accuracy at any time and in any place and at a negligible expense. The "Ives' Daylight Producer" is a very simple affair, being merely a mahogany cabinet, 18 inches deep, 30 inches wide and 28 inches high, surmounted with a domelike reflector. All inner surfaces are white. The front and sides are open for the insertion of the articles to be compared. Inside the upper part of the cabinet are 2 double plates of glass, the coloring of which is scientifically worked out, and is the chief factor of the whole appliance. Above the plates, and within the aluminum dome, is a Welsbach "Ivelite" gas mantle light, the mantle being of such composition that, when its rays are projected through the colored glass, a perfect reproduction of average daylight is produced in the lower part of the cabinet.

Although, as stated in the foregoing, the Ives' "Daylight Producer" is simple in appearance and operation, it really represents a clever invention. Average daylight being a combination of a vast number of colors in various proportions, the chief obstacle to an artificial reproduction thereof in the past has not been the production of these colors, but rather in securing a light which would contain all of them in the *identical* proportions as they exist in daylight. The latter, of course, varies, and noon daylight varies from that of the afternoon, the difference being chiefly in the increased red in the latter, or as a northern light differs from a southern one.

Professional color matchers prefer a north light, and this is the one reproduced in the Ives' "Daylight Producer." Although the apparatus has been in use for some time, it was withheld from the market until exhaustive tests, extending over a long period of time, and carried on under varying conditions, have established its absolute accuracy and serviceability. It is made by the Welsbach Company, and is ready for distribution.

Items of Interest
FROM VARIOUS LOCALITIES.

The Public Service Commission (Second New York District) has finally disposed of the long-drawn out case respecting the petition of certain officials of Buffalo, that the Buffalo Gas Company, the Buffalo General Electric Company, and the Cataract Power and Conduit Company, be obliged to reduce their rates for gas and electric currents supplied to the city for public account and use. Under the ruling, the Buffalo Gas Company is directed to charge not in excess of 90 cents per 1,000 cubic feet—the Company was charging 95 cents per 1,000, and the city was paying only 70 cents, the 25 cents being withheld until this decision was rendered; the Cataract Power and Conduit Company is ordered to make a horizontal reduction amounting to 28 per cent.; and the following reductions (per cent. basis) are put on the Buffalo General Electric Company: Residence, 28; general power, 32.7; large light and power consumers, 33.2; street arc lighting (city service), 10 per cent. The "Wright Method" is in use in Buffalo. This happily terminates a struggle on the part of the people in control of the Buffalo Gas Company, who conducted this campaign along lines that brought them well within the limits prescribed by the Supreme Court of the U. S., in its famous decision respecting the rate limit as applicable to the city of New York. So we have said, and we here repeat, that this contest brings added renown to the fame of Dr. A. C. Humphreys, as a fair fighter and a redoubtable general in the field of statistics.

In connection with this case the blunt fairness of Governor Sulzer should be praiseworthily admitted. Quite some pressure was brought to bear upon him to appoint a successor to Public Service Commissioner Frank W. Stevens, whose term of office unfortunately expired January 1st, 1913. The Governor, however, knowing the importance of this case, and being fully aware of Commissioner Stevens intimate relation thereto, refused to name a successor until the Commission had rendered a decision In fact, it looks a decided misfortune that the Governor has, because of political stress, to appoint a man of Democratic policies, instead of reappointing Mr. Stevens, whose course on the Public Service Board has been such as to evoke commendation from every fair-minded, right-thinking man in the Empire State.

Mr. T. Clive Jones, Secretary, Natural Gas Association of America, responding to an inquiry, under date of the 11th inst., among other things, writes: * * * "We had a most trying time here in Delaware; but I am glad to tell you that my family were high-and-dry, so that we did not experience any personal hardship. On account of broken pipes, we [Mr. Jones is also President of the Delaware (O.) Gas Company] were compelled to keep our town without gas for 4 days; but, under the circumstances we did remarkably well. Just at this time I am quite busy arranging for our annual meeting next month." * * *

The Board of Public Works, Fremont, Neb., after an exhaustive investigation (which was put upon the Board by the City Council) reported back that it would be necessary to bond the city in the sum of $75,000, in order to construct the gas plant that was to be operated on municipal account in conjunction with the public power plant. This will likely prove to be the end of the proposition, for the Mayor of Fremont, at the outset, was quite positive that such a plant would involve an expenditure not to exceed $25,000.

The Benton-Harbor-St. Joseph (Mich.) gas properties have been taken over by a Chicago syndicate, headed by Mr. E. C. Beach, who has been elected President and Treasurer of the succeeding corporation. Our informant adds that this change will dispense with the services of one of the few women (Miss J. J. Deckerman) who have had to do with the management of gas companies in this country. Miss Deckerman had been Manager of the named corporation for 5 years or more.

The American Gas Engineering Company has been incorporated by Messrs. E. M. Parmalee, L. L. Rowland and B Lucas. It is capitalized in $50,000, and its main place of business is Sheboygan, Wis.

"B. V. M.," writing from Quincy, Mass., under date of the 11th inst., says that, on the evening of the 8th inst., the employees of the Citizens Gas Company, of that city, at a meeting, held in the Company's offices on Granite street, formed a preliminary organization for mutual instruction, entertainment, etc. Preceding the meeting

they were the guests of the Company at a supper served in Thompson's Cafe. At the subsequent meeting a tentative draft of a constitution and by-laws was drawn up, and these officers were elected: President, Alfred J. La Croix; Vice-President, M. Lynch; Secretary-Treasurer, John Hayes; Executive Committee, Jas. O'Donnell, Fred. Howe, Jno. Muir. At the meeting addresses were made by Mr. William G. Nichols and Mrs. Annie Herzig, the demonstratress of the Company. Following adjournment the party attended the show at Kincaide's Theater, as the guests of the management, and during the numbers the visitors were frequently made targets for the "jokes" of the actors.

THE result of the agitation respecting the price of gas in the Newtown district of Brooklyn, N. Y., has been an offer by the Newtown Gas Company to immediately reduce the selling rate to 95 cents per 1,000, and forego the hearing for a reduction which was to have been argued before the Public Service Commission, First District, last week. The Company is a subsidiary of the Brooklyn Union Gas Company.

THE special meeting of the shareholders of the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md., which was set for the 7th inst., was postponed until the 25th inst.

THE proprietors of the Kent County (R. I.) Gas Company, through their Attorney (Judge Felix Herbert) have sent out circular letters to the taxpayers of the Coventry, Warwick, Crompton, Riverpoint and Phenix fire districts in the effort to ascertain whether or not the residents of Pawtuxet Valley are desirous of having gas installed and for what purposes they would use the product. If the percentage of affirmative replies is sufficient, a works will be constructed forthwith; and our correspondent adds, "There is no 'if' about it, for I am confident that ⅔ of the taxpayers will eagerly assent to the proposal."

MR. FRANK A. WOODHEAD, Engineer to the Light, Heat and Power Corporation, of Boston, Mass., is back again at headquarters (77 Franklin street), having completed and put into successful operation the gas plant, with distributing system, at Daytona, Fla., completed last winter by the Light, Heat and Power Corporation.

WE regret to have to chronicle the fact that the popular Commercial Manager (Mr. L. M. Yetter) of the Atlantic City (N. J.) Gas Company has been quite a sufferer from illness for nearly 2 months; and it also pleases us to report that he is convalescing. In fact he expects to return actively to his field of duty by the 1st prox.

MR. G. W. CURRAN, Secretary of the United Gas Improvement Company, informs us that the annual meeting of the named corporation will be held in the home offices, Broad and Arch streets, Philadelphia, Pa., at noon of the 5th prox. The transfer books will be closed from 3 P.M. the 23d inst. to 10 A.M. of the 6th prox.

MR. THOS. D. MILLER, writing from Chicago, under date of the 14th, inst., says, among other things: "We recently had 15 or 20 cars of run of mine Elkhorn gas coal tried out in the Rockford (Ills.) plant, which as you know, is equipped with a machine-stoked house. Very satisfactory results came from it, confirming my convictions regarding the quality of this material. We are now able to quote on ¾-lump, as we have a by-product plant using a large quantity of our run-of-mine coal, and willing to take all of the ¾-slack that we produce in place of run-of-mine coal, and at equal price. This you must concede is a very high compliment to our coal as to its quality. Indeed, I really do not know another that produces a slack from its run-of-mine of a quality sufficient to meet the demands of a by-product plant. * * *"

WE are told that the tallest tower in the United States carrying a light is at Cape Hatteras, on the low-lying coast of North Carolina, which structure is 200 feet from its base to top of lantern. The highest light, however, is the one at Cape Mendocino, on the coast of California, which is on a cliff, the house structure itself being only 20 feet in height.

"B. S. G.," writing from Springfield, Mass., under date of the 12th inst., says: "The third annual exhibit of the Milford (Mass.) Electric Light and Gas Company, which lasted a week, and which was carried to a brilliant close about a fortnight ago, was successful in every way. On the closing night, Mr. John Waterman, of Boston, Manager of the Massachusetts Lighting Companies, which corporation is the operator of the Milford lighting plants, and Mr. C. E. Lasher, of Pawtucket, R. I., and former Manager at Milford, were the guests of the evening. Both complimented Superintendent Wm. H. Leonard and his assistant, Mr. Poore (in charge of the electrical division) on the excellence of the display, which was easily the most elaborate of all like displays heretofore conducted in busy Milford,"

EX-SENATOR JOHN KEAN'S Rahway (N. J.) gas rate will hereafter be 90 cents per 1,000 cubic feet, net.

ADVICES from Rochester, N. Y., dated the 11th inst., are to the effect that, earlier in the week, "The History of the Development of Incandescent Gas Lighting" was the subject of an interesting address by Mr. H. S. Miner, Chief Chemist of the Welsbach Light Company, before the members of the Rochester branch, American Chemical Society, in the Eastman Building, University of Rochester. The address was well illustrated by means of lantern slides, and the speaker traced the development of lighting facilities, from the crude methods, employed in the earliest times, to present day. A particularly interesting chapter in the speech was his explanation of the methods used in the manufacture of the mantles. Several employees of Brother Searles huge lighting and railway corporation were in the audience.

THE Mayor of Concordia (Mr. Short) Kas., backed by the Commercial Club, of that city, is making a decided attempt to either engage the authorities in the construction and operation of a gas plant, or to induce outside capitalists to make the venture. From this distance, it looks that such an enterprise, if properly initiated, would be a paying investment from the start.

SUPERINTENDENT KEPPELMAN, of the Consumers Gas Company, of Reading, Pa., has officially notified the City Council that his Company has purchased all the properties of the Birdsboro Gas Company. The new owners will hook up the Birdsboro main system by means of a 4-inch high pressure line, and the Birdsboro plant (which has been in control of the Reading folks for some months) will be dismantled. The main pipe line will be 9 miles in length, and the estimated cost of the burying of the pipe, everything included, is $30,000. However, the line along its whole length will run through 4 settlements that will readily yield a total of 300 consumers, the gas rentals from which will easily pay 5 per cent. on the investment.

THE Syracuse (N. Y.) Suburban Gas Company, of which Messrs. Louis Burkhead, O. K. Evans and Wm. Schuck are the promoters and proprietors, and which proposes to supply gas to the residents of East Syracuse, is duly organized, and is in the market for bids on plant and main construction. The Public Service Commission, Second District, considered the application of the promoters last week, and there is every reason to believe that a favorable return will be made.

AT the postponed annual meeting of the shareholders in the Hagerstown (Md.) Gas Company the following results were reached: Directors, F. T. Hepburn, H. L. Lane, J. C. Lane, A. E. Albert, Albert Heard, George E. Stover and H. S. Brown; President, F. T. Hepburn; Vice-Presidents, J. C. Lane and A. Heard; Secretary, H. N. Lane, who replaces Mr. S. N. Loose, resigned; Treasurer and General Manager, M. M. Milton.

MR. N. F. BRADY has succeeded his father (Anthony N. Brady) as President of the New York Edison Company; the senior Brady, however, remains Chairman of the corporation's Board of Directors.

THE Linton (Ind.) Gas Company will rebuild its plant, and it will also extend its mains to supply gas to the outlying settlements of Dugger, Jasonville, Niggertown, Cass, Vicksburg and Midland.

SUITS have been filed by the authorities of Portland, Ore., against the Portland Railway, Light and Power Company and the Portland Gas and Coke Company, to recover a three per cent. city tax on the gross receipts for 1912. Last year similar suits were filed against the Companies to recover on like account for a part of 1911. The Utility Companies contend that, under their charters, the city has no right to levy this charge, hence their resistance. In connection with the tax suits the city asserts also that it will attempt to prove that the Portland Railway and Light Company is selling current for power and light without a franchise.

THE reports of the Massachusetts Lighting Companies for first 7 months of fiscal year show an addition of 1801 consumers, as compared with those on the books for the corresponding period last year. The gas sendout shows an increase amounting to 6½ per cent. in a like comparison.

ACCORDING to a Massachusetts State law, passed at this session of the Legislature, it will be unlawful for any person or company supplying gas to charge a consumer for the use of a meter, for any part of the fiscal year, provided the consumer used gas to the value of $7 or more during the year. It is also provided, in case such charge is made, that the person or company may be fined $100 for each overcharge.

The Market for Gas Securities.

The tone to the general market during the week was all to the low side, although, as we've written many scores of times in the last 5 years, there is a plenty of the best evidence that the figures should be up instead of down. To-day (Friday) Consolidated came in at 132½ to 133¼, which is a loss of 2 points. Some real long stock (800 shares) came out yesterday.

Brooklyn Union also had an attack of the "slows," but the suggestion respecting Consolidated applies with even greater force to Brooklyn Union. Perhaps—yes, more than perhaps—that Company is not exceeded in financial strength by any other corporation in the country. Lacledes are just below par in the bid; Peoples, of Chicago, shows good strength in its tone; and Washington gas still maintains its recent marked advance.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

APRIL 21.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	132½	133¼
Central Union Gas Co. — 1st 5's, due 1927, J. & J.	8,500,000	1,000	108	106
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	166	106
Mutual Gas Co.	2,500,000	100	72	177
Detroit City Gas Co.	6,580,000	—	—	50
Detroit Gas Co., 5's	381,000	1,000	75	80
" Prior Lien 5's	5,619,000	1,000	97	100½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	101	102½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	59	63
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	98	100
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	99½	101
Standard	5,000,000	100	60	70
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	123	133
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	200,650	500	180	—
Out-of-Town Companies.				
Bay State	50,000,000	50	0.19	0.20
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,860,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	29,500,000	100	87	90
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084		118¾	119
Mortgages, 5's	3,400,000		—	—
General Mortgage 4½	10,661,000		—	—
Con. Gas Co., Baltimore City, 4½	2,751,000		—	—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	94	96
Bonds	75,000	—	—	100
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	133
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	38	45
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	91	
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	99½	101
Preferred	2,500,000	100	99	102
Bonds	10,000,000	1,000	103¾	108
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	120	130
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	108	
Massachusetts Gas Companies, of Boston	25,000,000	100	89	89¼
Preferred	25,000,000	100	92¾	93
Montreal L. H.& P., Canada	2,000,000	100	235½	236
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	182	190
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	112	113
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105¼
Pacific Gas and Electric Co.	15,500,000	—	58½	60
St. Joseph Gas Co.— 1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	105
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	422½	425
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting Sept. 1913. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keilior, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Gas Meters.—Monthly Section Meetings; Grand Commissioner, I. W. Petty, New York; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, Will W. Barnes; Secretary, John M. Brock, 204 Percy street, Flushing, N. Y. Philadelphia Section; Chairman, L. R. Dutton; Secretary, H. F. Patterson, Jr., 833 Chestnut street. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, F. M. Roberts, Haverhill; Sec., F. K. Wells, 69 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, May 22, 23, 24, 1913; Burlington, Ia. Officers: President, C. W. Fair, Atlantic, Ia.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association.—Annual meeting, September, 17, 18, 19, 1913; ———— Officers: President, W. S. Blauvelt, Detroit, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1913; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, Cleveland, O., May 20 22, 1913; Officers: President, M. B. Daly, Cleveland, O; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914 Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, April —, 1913, ———— N. J.— President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn Belmar, N. J.

Ohio Gas Association.—Annual meeting, February ————, 1913, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City May, ——1913. President, F. W. Caldwell, Shawnee, Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry B stwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ————, 1914; Officers, President, J. A. Frick, Allentown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, Charlotte, N. C., April 18-20, 1913, Officers: President, C. E. White, Montgomery, Ala.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May 21, 22, 23 and 24, 1913, Galveston, Tex. Officers: President, F. M. Lege, Jr., Galveston, Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 14 and 15, 1913, Milwaukee, Wis. Officers: President, I. F. Wortendyke, Janesville, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.